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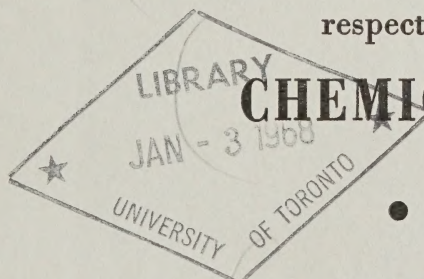
Report (by) of

THE TARIFF BOARD

in Reference 121

Relative to the Inquiry Ordered
by the Minister of Finance
respecting

CHEMICALS



VOLUME 13

**MISCELLANEOUS CHEMICAL PRODUCTS IN HEADINGS
37.08 AND 38.02 TO 38.19
OF THE BRUSSELS TARIFF NOMENCLATURE**

Reference No. 120



Report by
THE TARIFF BOARD

Relative to the Inquiry Ordered
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37.08 AND 38.02 TO 38.19
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Reference No. 120

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Catalogue No. FT4-120/13

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1967

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M.S. Islam (38.11)

The Honourable Mitchell Sharp, P.C., M.P.
Minister of Finance
Ottawa

Dear Mr. Sharp:

I refer to Mr. Harris' letter of September 21, 1956 and to Mr. Fleming's letters of October 11, 1957 and December 21, 1959 in which the Tariff Board was requested to conduct an inquiry respecting chemicals.

In conformity with Section 6 of the Tariff Board Act, I have the honour to transmit Volume 13 of the Report of the Board, in English and in French. This volume contains the report on miscellaneous chemicals and preparations in Headings 37.08 and 38.02 to 38.19 of the Brussels Tariff Nomenclature. Further volumes will be forwarded to you as soon as they have been completed.

Yours sincerely,

A handwritten signature in dark ink, appearing to read "J. C. Campbell". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Chairman

Explanation of Symbols Used

- Denotes zero or none reported
- .. Indicates that figures are not available
- * In statistical tables, indicates a reported figure which disappears on rounding, or is negligible
- (a) A small letter in brackets denotes a footnote to a table
- (1) A number in brackets denotes a footnote to the text
- s.c. Denotes a Dominion Bureau of Statistics import or export statistical class

The sum of the figures in a table may differ from the total, owing to rounding

A Note on the Organization of the Report - Reference 120

The first four volumes of the Report by the Tariff Board respecting Reference 120, Chemicals, relate to the reference as a whole; the eleven volumes which follow (Volumes 5 to 15, inclusive) relate to the products which were the subject of the Board's inquiry. The principal subject matter of each of the volumes is given below in terms of the headings of the Brussels Tariff Nomenclature (B.T.N.). Occasionally, chemicals of different B.T.N. headings are dealt with together, for example, chlorine (28.01) and caustic soda (28.17); the more detailed tables of contents of the individual volumes indicate where this occurs.

To the extent that particular statistical tables could be related to specific products or B.T.N. headings they are included in the statistical appendix of the volume which deals with that product or heading. Some tables, which could be related only to broader groupings of chemicals, are included in the statistical appendix to the last volume dealing with such broader groupings: inorganic chemicals in Volume 7, organic chemicals in Volume 9 and artificial resins and plastics in Volume 15.

Because of the unprecedented amplitude and complexity of Reference 120 - Chemicals, many parts of Volumes 5 to 15 were written a considerable time before the first four volumes. This gives rise, occasionally, to apparent discrepancies, attributable to the passage of time, particularly between Volume 4 and those which follow.

Table of Contents for Volumes 1 to 15, inclusive

General Volumes

Volume

1	Recommended Schedule
2	Goods in Recommended Items
3	Goods in Existing Items
4	General Considerations; Summary and Conclusions

Reports on Products

Volume

General Description

B.T.N. Headings

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6	Inorganic Chemicals	26.03 and 28.18 to 28.34
7	Inorganic Chemicals	25.32 and 28.35 to 28.58
8	Organic Chemicals	15.10, 15.11, 22.08, 22.09 and 29.01 to 29.13
9	Organic Chemicals	15.10 and 29.14 to 29.45
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11	Dyes, Paints, Inks, Fillers	25.09 and 32.01 to 32.13
12	Detergents; Explosives	34.02, 36.01, 36.02
13	Misc. Chemicals & Preparations	37.08 and 38.02 to 38.19
14	Artificial Resins & Plastics	39.01 and 39.02
15	Artificial Resins & Plastics;	39.03 to 39.07
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* The numbers shown after product designations are those used in the Brussels Tariff Nomenclature

PHOTOGRAPHIC CHEMICALS - 37.08 AND
MISCELLANEOUS CHEMICAL PRODUCTS - 38.02 TO 38.19

INTRODUCTION

In the Brussels Nomenclature, Chapter 38 covers a large number of chemical preparations and related products, mainly in the nature of mixtures. Many of these, in turn, are made from materials that are not chemically pure, a large number of which are naturally occurring vegetable or mineral materials. Except for some products of headings 38.01, 38.11, 38.17 and 38.19, the chapter does not provide for separate, chemically defined elements or compounds; these are usually classified in Chapters 28 and 29. In addition to Chapter 38 of the B.T.N., this part of the report includes a group of photographic chemicals classified in B.T.N. heading 37.08, some of which may be chemically defined elements and compounds.

This part of the report covers the headings of B.T.N. Chapter 38 except heading 38.01, "Artificial Graphite; Colloidal Graphite, Other than Suspensions in Oil". Graphite is dutiable in the Canadian Customs Tariff under end-use item 314a and, as plumbago, under tariff items 313 and 314, none of which is in Reference 120. Colloidal graphite is dutiable under item 220a. No representations were received on this product. Heading 38.19 is a residual heading in the Brussels system of classification, much like tariff item 220a and, to some extent, item 711 of the Canadian Customs Tariff. However, not all of the products of heading 38.19 are within the terms of Reference 120.

Data on the commercial importance of products classified in B.T.N. Chapter 38 are incomplete; the products appear to have a market value in Canada of about \$150 million. Relevant imports, in 1964, were in excess of \$60 million. Exports are relatively small, probably less than \$5 million. Thus, although Canadian production of these products is substantial, a large part of the market requirements is met by imports; many of these are specialty products of one type or another, not available from Canadian production.

One group of products, the pesticides of heading 38.11, represents about one-quarter of the market in Canada for products of Chapter 38. Many of the basic pesticide preparations, in finished or intermediate form, classified in heading 38.11, are not made in Canada and must be imported; total imports of products of types relevant to the heading were about \$14 million in 1964, virtually all from the U.S.A.

About the same share of the total market consists of the anti-knock preparations and other additives for gasoline and mineral oils, classified in B.T.N. heading 38.14. The largest part of the market is for anti-knock preparations and most of the remainder is for additives for lubricating oils. Of the market, in excess of \$30 million in 1964, about 40 per cent was supplied by imports.

The market for the products of heading 38.19 is in excess of \$65 million, about \$12 million of which is accounted for by anti-freeze preparations. The anti-freeze preparations are essentially all of Canadian manufacture; imports of other preparations of heading 38.19 probably have a value of about \$30 million.

The products of Chapter 38 may be entered into Canada under a large number of tariff items, for most of which the rates of duty are either Free under both Tariffs or 15 p.c., B.P., 20 p.c., M.F.N. For the chapter as a whole, considering only dutiable goods, the average rate of duty paid on identifiable products was about 13 p.c. in 1964. However, in 1964, some 45 per cent of imports was entered duty-free. For heading 38.11 alone, 96 per cent of total imports was entered free of duty under various tariff items. For 38.14, while less than one per cent of total imports was entered duty-free, the amount of duty paid was only about 8 per cent on dutiable imports. For heading 38.19, about 45 per cent of total imports was entered duty-free and the amount of duty paid was about 14 per cent of dutiable imports.

The following report deals in numerical sequence with the headings of the chapter; within each heading the products of greatest commercial importance are generally treated first, followed by those of lesser commercial significance.

Heading 37.08

Tariff item 761, referring to collodion and other chemicals used by photo-engravers, lithographers, rotogravure printers or engravers of copper rollers, is part of Reference 120. In the Brussels Nomenclature, these products are classified in headings 39.03 and 37.08; the report on heading 37.08 is included at the end of the product reports on Chapter 38. The market for photographic chemicals is estimated to be in excess of \$7 million annually.

ANIMAL BLACK (FOR EXAMPLE, BONE BLACK AND IVORY BLACK),
INCLUDING SPENT ANIMAL BLACK - B.T.N. 38.02

Classified under this heading are products obtained by reducing to charcoal materials of animal origin. The most important product in this group is bone black, also known as animal charcoal or bone char; it is made usually by calcining dried bones in an airtight vessel after they have been freed from fat and ground to a coarse powder. One ton of dried bones yields about 700 pounds of bone black. The charred bones are then ground again to a fine silky powder with a deep, dense, bluish-black colour especially valued for engraving inks and for giving a dull, velvety-black finish to coated paper. Bone black has larger particle size and wets more rapidly than carbon and lamp blacks; it usually contains only about 10 per cent of carbon, the rest being largely ash, and its covering power is inferior to that of carbon black. Compared with other black pigments, bone black is not considered the best, although it may sometimes be treated with acid to remove the lime salts and thus have its characteristics improved; however, it is recognized as a superior absorbent for purification of sugar solutions or decolourizing agent. It is said that about 75 per cent of the production is used for refining sugar and syrups. Spent bone black, after having been used for decolourizing, may be utilized as a fertilizer or, after it has been washed and reground, as a cheap black pigment. Bone black may also be prepared, apart from powder, in the form of grains, paste or bone-shape pieces.

In addition to bone black there are other products discussed under this heading, which include: blood black obtained by calcining dried blood in a closed vessel and used generally as a decolourizing agent; ivory black made by heating the refuse of ivory working in a closed retort and subsequently grinding it to a very fine velvety black powder used in artists' colours; other blacks are obtained from materials of animal origin, such as leather, horns, hooves and tortoise-shells. However, a number of important carbon blacks are dealt with under B.T.N. heading 28.04; these include carbon black from natural gaseous hydrocarbons, anthracene black, acetylene black and lamp black.

Bone black and other animal blacks are at present classified for Customs purposes principally under tariff items 239, 689 and 711; however, most of these products may be entered under tariff item 689 as animal charcoal for use in the refining of sugar, duty-free, B.P. and at 25 p.c., M.F.N.

As far as the Board could ascertain, there are no Canadian manufacturers of the products under discussion; all the domestic requirements are met by importations. In the years 1960-63, imports of certain of the blacks averaged \$350,000; animal charcoal, imported mostly from the U.K. under tariff item 689, for use in sugar refining, constituted about 93 per cent of this value, while bone and ivory blacks imported principally from the U.S.A. to be used principally in pigments and inks accounted for the remainder.

A. Imports of Animal Charcoal for Use in the Refining
of Sugar or Corn Products, 1962-64

	All Countries			United Kingdom		
	'000 lb.	\$'000	\$/lb.	'000 lb.	\$'000	\$/lb.
1962	3,121	326	.10	2,673	299	.11
1963	3,611	398	.11	3,611	398	.11
1964(a)	5,109	491	.10	4,576	465	.10

B. Imports of Bone Black and Ivory Black, 1962-64

	All Countries			United States		
	'000 lb.	\$'000	\$/lb.	'000 lb.	\$'000	\$/lb.
1962	128	24	.19	128	24	.19
1963	158	29	.19	158	29	.19
1964	..	..	..	..	..	..

(a) Revised to "Animal Charcoal" to include also charred bone from former s.c. 2054, "Bone dust, charred bones"

Source: D.B.S., Trade of Canada, Imports

The annual consumption of bone black by the sugar refining industry was reported by the D.B.S. to be somewhat more than 3 million pounds. In 1963, for example, 3.2 million pounds were used, valued at \$365,000, an average value of 11.3 cents per pound. Paint and varnish manufacturers appear to use 50,000 to 70,000 pounds, at an average value of 20 to 30 cents a pound.

The Industry Committee proposed that the wording of B.T.N. heading 38.02 be adopted for the purpose of classifying the products discussed above. The Committee believed that all commercially important products of heading 38.02 were dealt with in the submissions presented by interested companies; for other products, the Committee recommended classification by heading 38.02 and rates of duty of 15 p.c., B.P., 20 p.c., M.F.N.⁽¹⁾ When questioned about possible difficulties between B.T.N. headings 38.02 and 31.01 and 31.02 (fertilizers), the spokesman for the Committee replied that no difficulty should arise and that he had no knowledge of spent animal black being used in Canada as fertilizer.

The Canadian Paint Varnish and Lacquer Association (CPVLA) submitted the following proposal:

"Until such time as bone black is available from Canadian sources, we respectfully request that this product be shown on 'List 3' of the Chemical Industry Committee 'Compilation of Duty Rate Proposals' at rates of 0% B.P. - 0% M.F.N."⁽²⁾

(1) Transcript, Vol. 103, p. 15608, 15616

(2) Same, Vol. 103, p. 15618

"List 3" was designed to show products which are not made in Canada.

The CPVLA stated further that bone black, classified in B.T.N. heading 38.02, is imported under tariff item 239 (Lamp black, carbon black, ivory black and bone black), duty-free under the two main Tariffs. The product, according to the Association's spokesman, is used as a pigment in the manufacture of paint, chiefly water-based black paints where a dull finish is preferred to a glossy sheen. Bone black was said to be preferred for this particular application because of more rapid wetting and because it imparts a bluish cast. No argument was put forward by the CPVLA in support of this proposal specifically, nor did the Association indicate why any provision other than duty-free entry would be appropriate if the product were to be made in Canada.

In a written submission to the Board, British Charcoal & MacDonalds Ltd. of Greenock, Scotland, the manufacturer and exporter to Canada of animal bone charcoal under tariff item 689, proposed that no change be made in the present Tariff;(1) the item provides entry duty-free under the B.P. Tariff and at 25 p.c., M.F.N. In support of its proposal the company claimed to be the only manufacturer in Britain of animal charcoal for use in the refining of sugar and argued that "any change could have the effect of tempting the sugar refiners to use a lower quality to the eventual detriment of the consumer." (2) Furthermore, the company submitted that it has given satisfactory service both in quality and after-sales service to its Canadian customers for over 30 years and that in recent years it has supplied about 82 per cent of Canada's imports of animal bone charcoal.

A similar proposal was received by the Board in a letter from Canada and Dominion Sugar Company, Limited of Montreal, Quebec. In that letter the company stated that it is very anxious to see that the present tariff structure of animal charcoal remains unchanged. In support of this stand, the company argued that, since animal charcoal is indispensable in its sugar refining operation, any increase in duty levied on this product would be reflected in its refining costs.(3) The company also added that, although it had received offers from alternative sources of supply, it found the product supplied by British Charcoals & MacDonalds superior to that of any other source. In 1959-1960, the company was importing 400 long tons of animal charcoal, valued at \$85,800. The Industry Committee suggested that if the duty-free entry provision under the B.P. Tariff were continued it be only while the product is not made in Canada.

(1) Transcript, Vol. 103, p. 15623

(2) Same, Vol. 103, p. 15623

(3) Same, Vol. 103, p. 15624

ACTIVATED CARBON (DECOLOURISING, DEPOLARISING OR ADSORBENT);
 ACTIVATED DIATOMITE, ACTIVATED CLAY, ACTIVATED BAUXITE AND
OTHER ACTIVATED NATURAL MINERAL PRODUCTS - B.T.N. 38.03

Products classified under this heading include certain non-metallic elements such as carbon, and mineral substances such as clays and alumina, modified by heat or chemical treatment; this process is usually known as activation; the process involves subjecting matter to high temperature in the presence of steam or other inert gas, or increasing the internal energy of molecules by a chemical reaction. "Activated" in this context implies that the porosity of the substance is increased. Products resulting from this activation process fall within two groups: (a) products characterized by highly porous particles, having marked capacity for adsorption (the property of attracting molecules of gas or liquid) and used chiefly as chemical adsorbents, catalysts or ion exchangers; (b) products which generally possess a rather low porosity, but which either facilitate or inhibit coagulation of colloids in aqueous suspension and, therefore, are suitable for use as filtering agents. Some activated preparations are classified in the B.T.N. by heading 38.19.

Activated carbon, known also as filter carbon, is a form of carbon produced by destructive distillation of wood or other vegetable or carbonaceous matter usually subjected to high temperatures in the presence of steam or carbon dioxide; sometimes hygroscopic substances such as zinc chloride, phosphoric acid or sodium sulphate are added to enhance its adsorptive capacity. This capacity is usually measured by internal surface of matter per unit of weight; for activated carbon, the adsorptive capacity is estimated to be some 3600 square feet per gram. Activated carbon derived from light woods and lignites is used chiefly for decolourizing and removing other impurities from liquids; carbon obtained from medium dense woods and shells is used generally for vapour and solvent recovery; carbon originating from very dense woods and, therefore, possessing considerable density and structural hardness is used mostly in gas-masks and toxic vapour adsorption; it can also be used as a catalyst support. For decolourizing or deodorizing oils and chemicals, activated carbon is usually mixed in a liquid; it can also be used in the form of powder and grains or pressed into plates, tubes or disks without a binder.

Imports of activated carbon were reported to be valued at more than \$700,000 annually in the years 1960 to 1962 and \$850,000 in 1963.

Activated diatomite, known also as activated diatomaceous earth, is a soft, granular earthy rock of porous structure composed of hydrated or opaline silica, formed originally by the siliceous skeletons of microscopic aquatic plants. After mining, diatomite is crushed and calcined with sodium chloride or sodium carbonate; sometimes it may be de-calcified with acids. When pure, it is usually in the form of a very fine white powder marked for its resistance to heat and for its chemical inertness. Similar to perlite, another natural mineral product which, when activated by heat treatment, expands to form a light fluffy material, activated diatomite has a very low apparent specific weight; both products are used for filtering purposes during the processing of various products such as chemical or pharmaceutical preparations, sugar, glucose and beverages.

"Activated clays" or "activated earths" is a term applied usually to some selected colloidal clays or clay-like earths such as bentonite marked for their ability to swell greatly with absorption of water, and activated by means of alkali or acid treatment. Alkaline activated clays are used as emulsifiers and suspension and agglomeration agents in the manufacture of polishing and cleaning preparations and, also, because of their swelling properties, for improving foundry sands and drilling sludge. Acid-activated clays are used chiefly for decolourizing oils, fats and waxes. Imports of activated clay for the refining of oils were reported by the D.B.S. as follows for the years 1957 to 1964. These were almost all from the U.S.A. and mostly imported free of duty.

Imports of Activated Clay for Refining Oils, 1957-64

<u>Year</u>	<u>'000 lb.</u>	<u>\$'000</u>	<u>\$/lb.</u>
1957	..	1,537	..
1958	..	981	..
1959	..	1,083	..
1960	..	936	..
1961	..	1,007	..
1962	..	934	..
1963	..	1,406	..
1964(a)	5,706	419	.07

(a) Revised to "Clays and earths, activated" and includes part of former s.c. 8415

Source: D.B.S., Trade of Canada, Imports

Activated bauxite is composed mostly of hydrous aluminum oxides activated by means of an alkali or thermal treatment; it is used chiefly as a catalyst, a desiccant and a decolourizing agent. Activated bauxite is classified for Customs purposes as alumina under tariff item 211, free of duty under all three tariffs. This item is not before the Board in Reference 120. Imports of activated alumina were reported to be valued at \$105,000 in 1962 and \$130,000 in 1963.

As noted above, certain activated vegetable or mineral substances are included in B.T.N. heading 38.03; other activated materials, such as activated carbon sold in small packages as medicaments by retail, purer grades of activated alumina, naturally active mineral products (fuller's earth), sulphonated coal ion-exchangers and catalysts fixed on a support of activated carbon or diatomite are provided for in B.T.N. headings 30.03, 28.20, chapter 25 and heading 38.19, respectively.

According to the information available to the Board, activated clay seems to be the only type of product under discussion which is manufactured in Canada.

Pembina Mountain Clays Ltd., of Winnipeg, Manitoba, is the sole producer of activated clays in Canada; the company is controlled, together with its U.K. associate The Fullers' Earth Union Ltd., by Laporte Industries Limited of London, England. Pembina Mountain Clays mines, by open cast methods in the Morden-Miami area of Manitoba, bentonite, the raw material for the production of activated clays. This raw material is a form of a sodium calcium magnesium bentonite, with a molecular lattice structure, having a marked adsorptive characteristic due to its large effective surface area. Dried and ground bentonite is then shipped to the company's plant in Winnipeg where it is subjected to an activation process; this consists of a treatment with hot sulphuric acid solution, the length of the treatment and the strength of the solution varying depending on the quality of raw material used. Filtration, washing, drying and grinding follow. Activation is considered the most costly part of the whole process of production of activated clay.

The principal customers of Pembina Mountain Clays are oil refineries, re-refiners of used lubricating oils, producers of vegetable, salad and cooking oils and soap manufacturers; they use activated clay for the purpose of decolourizing mineral lubricating oils, vegetable and animal oils and fats. The company also sells natural clays mostly for pelletizing cattle and poultry feeds, but these constitute only a small proportion, said to be about 15 per cent of total sales by volume; in value terms, the proportion is considerably lower. The total Canadian market for activated clays was estimated at the time of the public hearing at about 4,500 tons a year. The main areas of consumption centre around Toronto, Montreal and Hamilton. The productive capacity of Pembina Mountain Clays' plant in Winnipeg was reported to be between 11,000 and 12,000 tons a year, well in excess of the domestic market.

Part of the company's output, varying from a half to as much as two-thirds of total output, is exported to the U.S.A., mostly to the northern part of that country. This market has been estimated to be about 80,000 tons a year and is protected by a duty of \$2 per ton plus 12½ p.c. ad valorem, said to be equivalent to some 17 p.c. against Canadian imports; there, the Canadian company competes against three firms, one of them a major producer. The company attempted to establish itself in foreign markets outside North America as well, but failed because of high overland freight costs in relation to such a low-priced product. This freight consideration apparently had been a limiting factor also in preventing the Canadian company from increasing its share of the U.S. market, but was said not to give Pembina Mountain Clays any significant advantage over a principal competitor in Jackson, Mississippi, in supplying the main areas of consumption around Toronto and Montreal.

As has been noted above, an important ingredient used in the activation process of bentonite by Pembina Mountain Clays' plant in Winnipeg is sulphuric acid; until recently the company imported this material from the U.S.A. Since the establishment of a sulphuric acid producing plant by Border Chemical Company Ltd., at Transcona, Manitoba, Pembina has been drawing on this source of supply. Prices of sulphuric acid from that source were said to be no higher than the U.S. prices.(1)

(1) Transcript, Vol. 103, p. 15657

There are no published price statistics available for activated clays; some general price information, though, was reported during the public hearing. The price of \$40 per ton, f.o.b. works, was quoted as typical for a large tonnage transaction involving both Canadian sales in the U.S.A. and U.S. sales in Canada. It was also reported that, at that time, the general trend in prices of activated clay was declining; this was attributed partly to competition and partly to the declining market as treatment with hydrogen replaces activated clay in oil refining.⁽¹⁾

The average annual value of imports of activated clay for the years, 1960-1963, apparently was some one million dollars, though the available data also include importations of some catalysts used in the refining of petroleum and imported free of duty under tariff item 263c. Practically all imports of activated clay are from the U.S.A.

The Board received no evidence that other products of heading 38.03 are produced in Canada. With the exception of activated carbon, they are believed to be of minor commercial importance. The value of imported activated carbon increased from \$710,000 in 1960 to \$850,000 in 1963; the major part of these imports originated in the U.S.A.

The products covered by B.T.N. heading 38.03 are at present classified for Customs purposes mostly under the following tariff items:

<u>Product</u>	<u>Tariff Item No.</u>	<u>Rates of Duty</u>	
		<u>B.P.</u>	<u>M.F.N.</u>
Activated carbon.....	238	Free	Free
Activated natural mineral products,			
- activated diatomite.....	) 295c	10 p.c.	10 p.c.
	) 711	15 p.c.	20 p.c.
- activated perlite.....	711	15 p.c.	20 p.c.
Activated clays and activated	) 263c	Free	Free
earths.....	) 295c	10 p.c.	10 p.c.
	) 711	15 p.c.	20 p.c.
Activated bauxite.....	211*	Free	Free

* Not in Reference 120

The Industry Committee proposed adoption of an item worded like B.T.N. heading 38.03 for classification of the products under consideration. With regard to activated alumina, activated carbon and activated diatomaceous earth, the Committee recommended "that any pertinent tariffs existing in these ... items be relocated to a position within the framework of Heading 38.03 in order to preserve the entirety of the classification structure for Heading 38.03."⁽²⁾

(1) Transcript, Vol. 103, p. 15645

(2) Same, Vol. 103, p. 15627

For products of B.T.N. heading 38.03 for which the Board did not receive submissions, the Committee recommended that they be accorded treatment by the classification and rates of duty for Heading 38.03. The rates proposed by the Committee were 15 p.c., B.P., 20 p.c., M.F.N. Activated alumina (grades purer than bauxite) is provided for specifically in B.T.N. heading 28.20.

Pembina Mountain Clays Ltd. submitted a proposal that rates of 15 p.c., B.P. and 20 p.c., M.F.N. be applied to imports of activated clay in Canada. Referring to this proposal, the company made the following statement:

"This proposal is, of course, in line with the general recommendation of the Industry Committee on rates for chemicals made in Canada. The application of a 20% duty to imports from the U.S.A. would give the Canadian producer tariff protection more in line with that enjoyed by U.S. competitors, bearing in mind the vastly different sizes of their respective domestic markets."(1)

Originally, in correspondence with the Board, the company had requested rates of 10 p.c., B.P. and 10 p.c., M.F.N., but changed this recommendation partly because, it reported, competition was getting worse and partly because of a fear that the existing rates might "be cut down to nothing."(2) A supporting statement by the Department of Industry and Commerce of the Province of Manitoba noted the importance of retaining the employment of some 32 persons and of assisting the only sulphuric acid plant in Manitoba. The company, it was noted, earns annually some \$300,000 in U.S. currency and replaces imports that would require payment in U.S. dollars.

The company pressed the belief that its existence as a producer of activated clays had brought lower prices to Canadian users, claiming that prices of activated clays have been declining for the past few years.

Given a choice, however, the company stated that a reduction in the U.S. duty would serve the company better than an increase in the duty into Canada.

When questioned during the public hearing about the quantity and the quality of grades of activated clay produced by Pembina Mountain Clays as compared with those produced by the U.S.A. competitors, the company's representative answered:

"We only make about six main grades, and we may introduce a small variation into one of those grades, to suit a particular customer.

"We cannot match their very top quality, and we work at that until we make changes involving capital expenditure at the plant which are not justified under present returns.

(1) Transcript, Vol. 103, p. 15636

(2) Same, Vol. 103, p. 15638

"I think our policy would be that as soon as the economic situation permits it, we would improve our grades further. We don't think our top grades are good enough to go out and sell for certain uses."(1)

During the discussion on the effectiveness of protection of the requested rates of duty, the representative stated that the company may close down if it is not offered that protection. Commenting further on prices of comparable grades of activated clay offered for sale by Pembina Mountain Clays and its competitors from the U.S.A., the representative remarked, "We undersell now. We don't sell unless we under quote the Americans"(2); this remark was meant to apply to both the Canadian and the U.S.A. markets.

In a written submission, the Rubber Association of Canada requested, on behalf of Dominion Rubber Co., Limited, that activated carbon remain free of duty, as at present (under tariff item 238).(3) The Association drew attention to the fact that Dominion Rubber is the sole Canadian manufacturer of reclaimed rubber and, as such, should not be handicapped in competition against reclaimed rubber, imported duty-free, by the imposition of duties on activated carbon used in production of reclaimed rubber. The Association noted that the Industry Committee had reported a proposal that activated carbon should remain free of duty under the B.P. and M.F.N. Tariffs until made in Canada, at which time, by that proposal, it would become subject to 15 p.c., B.P. and 20 p.c., M.F.N. rates of duty.

During the course of correspondence with the Board, Union Carbide Canada Limited, Toronto, Ontario, which imports small quantities of activated carbon from the U.S.A. for resale purposes, suggested that this material be listed duty-free from all countries until it is produced in Canada.(4)

(1) Transcript, Vol. 103, p. 15651-2

(2) Same, Vol. 103, p. 15656

(3) Same, Vol. 104, p. 15665

(4) Letter, October 29, 1962

AMMONIACAL GAS LIQUORS AND SPENT OXIDE PRODUCED
IN COAL GAS PURIFICATION - B.T.N. 38.04

Products classified under this heading are commonly derived as by-products during a coal gas purification process. Ammoniacal gas liquors are concentrated aqueous solutions obtained as a result of the destructive distillation of bituminous coal during gas or coke manufacture; they are usually brownish liquids composed of ammonia and ammonium compounds and containing also sulfuretted hydrogen and cyanogen. Anhydrous ammonia, ammonium hydroxide, ammonia sulphate and other ammonium salts are among the various substances extracted from ammoniacal gas liquors; these liquors are also used as a source of ammonia during the Solvey process for producing soda ash. Spent oxide, sometimes also referred to as gas-house tankage, is a residue obtained from passage of impure coal gas over a mass consisting usually of bog iron ore or of hydrated ferric oxide, sawdust and calcium sulphate. During the passage, certain impurities, such as sulphuretted hydrogen (hydrogen sulphide) and hydrocyanic acid are removed. The residual mixture contains sulphur (from hydrogen sulphide), Prussian blue, some ammonium salts and other substances. It is usually found in the form of powder or granules, varying in colour from greenish to brownish and possessing a characteristic, disagreeable odour. Spent oxide is said to be used as a source of sulphur and cyanides and, also, as a fertilizer or an insecticide.

According to the information available to the Board, products under discussion are not produced in Canada for any significant commercial purpose, nor, apparently, are there significant imports. With reference to the market situation, the spokesman for the Industry Committee made the following comments:

"None of these products were reported to the Committee. As far as it is aware they are currently not significant as goods of commerce in Canada because here natural gas has generally superseded coal gas.

"I am not aware that there has been any international trade in these materials so far as Canada is concerned."⁽¹⁾

Ammoniacal gas liquors and spent oxide are at present classified for Customs purposes as follows:

<u>Commodity</u>	<u>Tariff Item</u>	<u>Rates of Duty</u>		<u>Remarks</u>
		<u>B.P.</u> (%)	<u>M.F.N.</u> (%)	
ammoniacal gas liquors	711	15	20	
spent oxide	(711	15	20	generally
	(663	Free	5	as fertilizer
	(663b	Free	Free	for the manufacture
	(			of fertilizer
	(219a(2)	Free	Free	as insecticide
	(791	Free	Free	for the manufacture
				of insecticide

⁽¹⁾ Transcript, Vol. 104, p. 15667

The Industry Committee was the only party expressing an interest in these products. It requested that an item like B.T.N. heading 38.04 be adopted for classification purposes and that rates of duty of 15 p.c., B.P., 20 p.c., M.F.N., those generally proposed by the Committee as the residual provision for the headings, be adopted. In support of its proposal a spokesman for the Committee remarked that, although at present ammoniacal liquors and spent oxide do not exist in Canada as significant articles of trade, they might become so in future. Referring to the recommended rates of 15 p.c., B.P. and 20 p.c., M.F.N., the Industry Committee's representative observed:

"We don't say that those rates are significant at all at the present time. But viewed generally, Canada does have large resources of coal that can be distilled, in the west and in the Maritimes. It is possible that sometime somebody will want to get hold of a coal distillation business and at that time tariffs for the by-products of coal distillation may become quite significant. So what we are doing is looking forward and anticipating the possibility, and, unless there is a good reason otherwise, we are suggesting 15 and 20 on heading 38.04."(1)

A similar commentary was offered by another representative of the Committee:

"Ammoniacal liquors are produced in Canada in thousands of tons, but it is in a pipeline that is never opened up. They put sulphuric acid into the pipeline and come out with ammonium sulphate ... certainly ammoniacal spent liquors are a large-volume product in Canada. If somebody all of a sudden were to decide to use them and if this happens to be on the Canadian side of the border, or on the U.S. side of the border coming that way, then certainly it will become an important tariff item for both countries."(2)

It would appear from the above comments that the Industry Committee was concerned with a tariff provision for some future contingency. This residual provision for an item for products of negligible commercial importance was proposed in order to retain uniform rates of duty and to maintain the nomenclature intact. The Committee expressed a preference for this procedure rather than a more general, basket-type provision even for products of negligible commercial importance, though it had on other occasions advised the Board to exercise restraint in establishing separate provisions for products of negligible commercial importance.

(1) Transcript, Vol. 104, p. 15669

(2) Same, Vol. 104, p. 15675

TALL OIL - B.T.N. 38.05

Considered under this heading is tall oil in its crude as well as refined form. Crude tall oil is obtained by an acid treatment of the black liquor left over in the process of manufacture of wood pulp by the alkali or sulphate process. It is a dark-brown, semi-fluid mixture containing fatty acids, resin acids and unsaponifiable, or neutral matter including substances such as steroid alcohols, higher alcohols, hydrocarbons and ketones. Its actual composition varies widely, depending on the type of pulp wood used. Crude tall oil is used primarily as a source of tall oil fatty acids and tall oil resin acids; to a smaller extent it is used also in asphalt emulsions and in the preparation of drilling muds, corrosion inhibitors and ore floatation agents.

Refined tall oil is generally obtained by distillation or chemical treatment of crude tall oil. Distillation under low pressures yields what is known as distilled tall oil; this product was reported to be used in Canada in a variety of applications, the principal of which is in the manufacture of soaps and detergents. Acid refined tall oil is generally one of the more important types of refined tall oil obtained by chemical treatment, but it is not known to be produced in Canada. It is produced by treating crude tall oil with a solution of sulphuric acid under controlled conditions; this yields a product more viscous and lighter in colour than crude tall oil, but with approximately the same ratio of fatty acids to resin acids.

The term "tall oil" is also often used to describe tall oil products of high fatty acid content. In this report, following the B.T.N. classification, these fatty acids are considered together with other fatty acids in the part of the report dealing with the products of B.T.N. heading 15.10. Similarly excluded from consideration here are tall oil resin acids (heading 38.08) and saponified tall oil obtained by neutralization of distilled tall oil by means of an alkali. The saponified product is considered as a soap and soaps are not before the Board in this Reference. It is classified as a soap in the Brussels Nomenclature, under heading 34.01.

At the time of the public hearing, the following firms were reported to be producing crude tall oil for sale: Dryden Paper Co. Limited, of Dryden, Ontario, Kimberly-Clark Pulp and Paper Company Limited, of Toronto, the KVP Company Limited, of Espanola, Ontario and Marathon Corporation of Canada Limited, of Marathon, Ontario.⁽¹⁾ There was also reported to be one other paper mill in Ontario, two in Quebec and three in British Columbia which could produce crude tall oil.

The combined potential annual output of crude tall oil by the four companies which were producing it in 1962 was said to be no more than 9,000 tons; a more recent estimate indicates that this may have since increased to about 18,000 tons.

(1) Transcript, Vol. 62, p. 9289

Imports of crude tall oil are reported together with those of refined tall oil and tall oil pitch. A survey conducted by the Department of Industry revealed that during the second half of 1964 imports of crude tall oil under the relevant statistical class came to 2,472 tons valued at \$178,585;⁽¹⁾ this suggests that, on an annual basis, imports amount to about 5,000 tons valued at some \$360,000. Imports of refined tall oil, by the same survey, were some 330 tons valued at about \$59,000, an annual rate of about 660 tons valued at just under \$120,000.

Hercules Powder Company (Canada) Limited is the only known processor of crude tall oil in Canada. At its plant in Burlington, Ontario, completed in July 1960, the company makes tall oil rosin (B.T.N. 38.08), tall oil fatty acids (B.T.N. 15.10), distilled tall oil (B.T.N. 38.05) and tall oil pitch (B.T.N. 38.10). Of these, only the distilled tall oil is under discussion in this section; it accounts for a relatively small portion of the company's output. By far the largest part of the company's production consists of tall oil rosin, all of which is used captively in the manufacture of rosin sizing, and of tall oil fatty acids, sold commercially. As already noted, tall oil fatty acids are considered in the part of the report dealing with the products classified under B.T.N. heading 15.10; tall oil pitch is considered with the products of heading 38.10 later in this chapter; the rosin sizing is classified by B.T.N. heading 38.12 and in the Canadian Customs Tariff by tariff item 39e, which is not part of Reference 120.

The products under discussion, namely the crude and the refined tall oils, are at present classified as tall oil under tariff item 585a, free of duty under all Tariffs. This tariff item was not mentioned in the Minister's letters setting out the terms of Reference 120. However, it was before the Board in Reference 131 pertaining to oilseeds, vegetable oils and related products, at which time the Board concluded that this item could more readily be dealt with in the context of Reference 120;⁽²⁾ its inclusion in Reference 120 was formally announced in the Board's Notice R-127 dated November 1, 1961. In addition to crude and refined tall oil, tariff item 585a has been interpreted to cover also tall oil fatty acids which, as noted earlier, are considered in the part of the report dealing with the products of B.T.N. heading 15.10. Similarly, the tall oil pitch provided for in item 585a is discussed with the products of heading 38.10, while the blends of tall oil with tall oil pitch are covered under heading 38.19.

For the preparation of drilling muds, tall oil may be entered free of duty under tariff item 848b. This item is not in Reference 120. As an oil for use in the flotation of ores, tall oil may be entered duty-free under item 270.

In the course of the public hearing the Board received five separate representations concerning the products under discussion. All of these urged that duty-free entry of these products be continued; they are discussed in greater detail below. Several of the submissions

(1) Department of Industry, Import Analysis Division, Import Survey I.A. Div. 40-65

(2) The Tariff Board, Oil-Seeds, Vegetable Oil and Related Products, Reference No. 131, Queen's Printer, Ottawa, 1963, p. 97

dealt also with the tall oil fatty acids classifiable under B.T.N. heading 15.10; to the extent that this is so they are discussed in the volume of the report dealing with the products of that heading. No representations were made by the producers of crude tall oil.

The Industry Committee confined its recommendations to a suggestion that tariff treatment for the goods of item 585a be provided on the basis of pertinent B.T.N. headings. With respect to rates of duty for products of heading 38.05, the Committee endorsed the recommendations included in the briefs submitted to the Board by other interested parties.

B.T.N. heading 38.05 does not provide a firm basis for differentiating between the various types of tall oil classified under it and the tall oil fatty acids classifiable under heading 15.10; in the absence of a precise distinction, problems would undoubtedly arise in the administration of these provisions. As noted earlier, at present no distinction need be made between many of the forms and types of tall oil and tall oil products for the purposes of Customs classification.

In a letter to the Board dated November 16, 1961, the Industry Committee offered a set of criteria for classifying fatty acids and related substances. Recommendations on this subject were also received from other interested parties, mostly during the public hearing in November 1961, relating to fatty acids, at which time this aspect was examined in considerable detail; a discussion of the various views expressed at that time is included in the volume of the report dealing with the products of B.T.N. heading 15.10.

Hercules Powder Company (Canada) Limited, of Montreal, requested that duty-free entry under the Most-Favoured-Nation Tariff be applied specifically to the crude tall oil classified under B.T.N. heading 38.05.⁽¹⁾ The company did not make any representations with respect to the refined tall oils covered by this heading.

As already noted, Hercules Powder is the only known processor of crude tall oil in Canada; it is also a major importer of this product. In support of its request for continued duty-free entry the company stated:

"Crude tall oil is produced in Canada in limited amounts, but not in sufficient quantity to provide the Canadian need for low-cost tall oil fatty acids and rosin. Accordingly, the importation of crude tall oil will be necessary to realize a successful and economical venture."⁽²⁾

Since the time of this statement there have been indications that the Canadian supply of crude tall oil has increased, but it is not known whether it is now sufficient in quantity to supply all of the needs of Hercules Powder, though the import data referred to above would suggest importations in 1964 of about 5,000 tons of crude tall oil.

(1) Transcript, Vol. 104, p. 15703

(2) Same, Vol. 104, p. 15702-3

In addition to considerations of quantity, however, the company, in its submission on tall oil fatty acids presented a year earlier, also noted that:

"The unsaponifiable content of Canadian crude tall oil ... may make it impossible for us to produce highly refined grades of tall oil fatty acids. We may, therefore, be forced to import foreign crude for that purpose."(1)

The spokesman for Hercules Powder also testified that:

"a large part of the use [of tall oil fatty acids] in Canada today is of a quality we cannot make in our present plant with Canadian crude or equal types of crude."(2)

When asked whether the company could import the higher quality crude from elsewhere, spokesman for the company stated:

"No, we can't -- to be very frank with you, we can't get high quality crude from the U.S.; we must take marginal [quality] crude that is not now being recovered and recover that and export that.

"There is that type of crude in the United States, but ... we don't believe we can get this in the immediate future because it is being used in the United States.

"It is not available to us."(3)

In the company's formal submission on crude tall oil, in November 1962, the comparative quality of Canadian and U.S. crude was not mentioned. The quality difference apparently has its principal impact on the recovery of fatty acids.

In a written submission, the Canadian Manufacturers of Chemical Specialties Association proposed that "tall oil or tall oil fatty acids with 99 per cent or less of fatty acid content be permitted duty-free entry into Canada."(4) In support of its submission the Association stated that:

"After many years of experimentation and usage it was found that tall oil fatty acid with less than 99 per cent fatty acid content could not be replaced by the commercially available fatty acids now manufactured in Canada."(5)

(1) Transcript, Vol. 62, p. 9276

(2) Same, Vol. 62, p. 9304-5

(3) Same, Vol. 62, p. 9305-6

(4) Same, Vol. 62, p. 9330

(5) Same, Vol. 62, p. 9330

This point was contested by the representative of five Canadian producers of fatty acids who claimed that they sell products interchangeable with tall oil fatty acids.⁽¹⁾ The five producers were: Canada Packers, Limited, Harchem Limited, Lever Bros., Limited and The Procter & Gamble Co. of Canada, Limited, all of Toronto, and Emery Industries (Canada) Limited, of London, Ontario. Their submission is discussed in the volume of the report dealing with the products of B.T.N. heading 15.10. No company claimed to be producing from tall oil a fatty acid of the requisite purity, but the five companies claimed interchangeability of their fatty acids with that from tall oil.

In a joint submission, Apco Industries Company Limited, Drew Brown Ltd., L.V. Lomas Chemical Co. Ltd., Standard Chemical Ltd., and Tennant Smith Ltd., all of Toronto, requested that the present classification and duty-free entry of tall oil and tall oil fatty acids under tariff item 585a be continued; the five firms also requested that should the Board adopt the Brussels headings, these products ought to be included under heading 38.05, duty-free under the B.P. and M.F.N. Tariffs.⁽²⁾ The five companies associated in the submission were said to be principally importers. Although their spokesman at the public hearing referred to both tall oil and tall oil fatty acids, it appears that their chief interest was in the latter.

In a written representation, Charles Albert Smith Limited, of Toronto, claiming to be one of the leading importers of tall oil from the United States, submitted that "the tariff status of tall oil (tall oil fatty acids) remain as presently covered by tariff item 585a, free from all countries."⁽³⁾

In the course of the public hearing on the products of B.T.N. heading 38.05, a submission was received from Cartier Chemical Co. Limited, R.M. Hollingshead Corporation of Canada, Limited, Dustbane Mfg. Co. Limited and Tennant Smith Ltd., concerning tall oil with at least 94 per cent fatty acid content. This product appears to be more properly classified under B.T.N. heading 15.10 and, consequently, this submission is dealt with in the volume of the report pertaining to the products of that heading. Similarly, representations were received from Dewey and Almy Chemical Division of W.R. Grace & Co. of Canada Ltd, respecting dried sulphate black liquor skimmings known under the trade name "Dry Airlon". This product appears to be more properly covered by B.T.N. heading 38.19 and, consequently, these representations are considered under this heading later in the present Chapter.

(1) Transcript, Vol. 62, p. 9339

(2) Same, Vol. 104, p. 15787

(3) Same, Vol. 62, p. 9357

CONCENTRATED SULPHITE LYE - B.T.N. 38.06

Concentrated sulphite lye is derived by concentration of spent sulphite liquor left over from the manufacture of wood pulp by the sulphite process. The description encompasses a variety of products of this type which, in North America, are commonly referred to as lignosulphonates; for sake of brevity, this term has also been adopted for the purpose of the following discussion.

Lignosulphonates enter the market in various degrees of concentration and consistency: as a dark-brown, viscous liquid, containing about 50 per cent solid matter; as a sticky brownish paste; as a dark, glassy and brittle mass, known also as sulphite or cellulose pitch; or in the form of dry, brown granules. In Canada, lignosulphonates are used principally as water-reducing agents in the preparation of mixed concrete and gypsum wall-boards; as binders in the manufacture of refractory bricks, ceramics, linoleum, foundry cores and in pelleting and briquetting; in the treatment of water; in tanning of leather, and as thinners of oil-well drilling mud.

Lignosol Chemicals Limited, of Quebec, P.Q., claimed at the time of the public hearing to be the only firm in Canada engaged in the manufacture of the products under discussion. A jointly owned subsidiary of Anglo-Canadian Pulp and Paper Mills, Limited, also of Quebec, and of Anglo-Newfoundland Development Co. Ltd., of Grand Falls, Nfld., the company has been producing lignosulphonates at its Quebec City plant since 1952; a pilot research plant for the study of waste liquor was built by the two parent companies in Chandler, P.Q. as early as 1943. At the time of the public hearing in 1962, the capacity of the Quebec plant was reported to be about 50,000 tons per year;⁽¹⁾ it is understood that the capacity of this plant has since been increased by 50 to 60 per cent, suggesting that it is at present capable of producing some 75,000 tons per year.

Lignosol obtains, free of charge, the spent sulphite liquor by pipe-line from the adjacent pulp mill of Anglo-Canadian Pulp and Paper Mills, Limited. During the conversion process, the spent sulphite liquor is first converted by means of sulphite precipitation to either ammonium or sodium based liquor which, in turn, is partly evaporated. The resultant slurry, containing 50 to 55 per cent of solid matter, is then fed into high-speed spray dryers where, within a few seconds, it is atomised and reduced to dry spherical particles containing only two to four per cent water; these particles, or granules, are hygroscopic and readily soluble in water.

The lignosulphonates processed by Lignosol are used in large quantities as water-reducing agents in the preparation of mixed concrete and gypsum wall-board and as binders in the manufacture of refractory bricks, ceramics and similar products; they also find application in a variety of other uses. Lignosulphonates sold by Lignosol were reported to range in price from 3¢ a pound to 8½¢ a pound, depending on type.

(1) Based on 50 per cent solid content

At the time of the public hearing, Lignosol was reported to be employing about 70 persons earning over \$350,000 in salaries and wages. Its sales of lignosulphonates were valued at slightly less than \$850,000, of which about \$500,000, or 60 per cent, was exported. More recent information shows that the company's sales have increased substantially since then, and the share of total sales represented by exports is reported to have declined to about 40 per cent; most of the exports are to the United States, the remainder going to a variety of other countries, including the United Kingdom, Australia, India, Germany and Japan.

Published statistics (s.c. 399-45) show imports of lyes from wood pulp manufacture to have ranged in recent years between some 6,500 tons valued at just over \$366,000 in 1960 and some 10,600 tons valued at \$723,000 in 1962; in 1964, the last complete year for which statistics are available, imports consisted of some 7,500 tons valued at about \$581,000, an average value of about 3.8 cents per pound. It would appear from these imports and from the sales figures cited previously, that the total Canadian market for lignosulphonates in 1960 or 1961 was valued at just over \$700,000 annually, of which some \$350,000, or one-half, was supplied by Lignosol. It is also evident that there has been a rapid increase since then both in the Canadian market and the share of it supplied by Lignosol. In addition to the substantial increase in Lignosol's domestic shipments, its export sales have also increased, although at a slower rate.

Practically all of the imports come from the United States; imports from other countries, chiefly Norway, have not amounted to more than two per cent of the total. In the United States, there were reported to be eight manufacturers of lignosulphonates, at least six of which were said to be exporting their products to Canada.⁽¹⁾ There is evidence that some of the imports consist of types of products not manufactured by Lignosol, including most of the lignosulphonates used in the tanning of leather, as well as some of the higher-priced types used as dispersants in the manufacture of pigments and dyes.

Lignosol's success in export markets has been attributed by the company partly to the high quality of its products and partly to regional factors; in some locations, it is cheaper to supply U.S. requirements of lignosulphonates from Canadian production and the converse undoubtedly is true with respect to some consumers in Canada. Of the \$581,000 imports entered in 1964, for example, 45 per cent were entered in Alberta and British Columbia. Most of the remainder were cleared through Ontario ports of entry.

Most of the lignosulphonates, other than those used as additives for drilling mud, are at present entered duty-free under tariff item 203 as a wood extract. The lignosulphonates for use in drilling for oil, natural gas, potash or rock salt are also admitted duty-free under tariff item 492a. As materials for drilling muds they might similarly be imported duty-free under item 492d or 848b. None of these three items is before the Board in Reference 120. No information is available concerning the distribution of imports between these various items.

(1) Transcript, Vol. 105, p. 15887, 15889

The Industry Committee recommended that B.T.N. heading 38.06 be adopted for the purpose of classifying the products under discussion. With respect to rates of duty, the Committee endorsed the request for rates of 15 p.c., B.P. and 20 p.c., M.F.N. submitted by Lignosol. The latter submission and the proposed wording are discussed below.

At the public hearings on October 17, 1962 and November 8, 1962, Lignosol made the following proposal:

"Lignosulphonates are covered under BR. No. 38.06 under the nomenclature 'Concentrated Sulphite Lye'. These products are also 'tanning extracts of vegetable origin' as covered by BR. No. 32.01. They are 'surface active agents' as referred to in BR. No. 34.02. They are used as 'prepared glues not otherwise specified' BR. No. 35.06. They are also classed as 'vegetable pitch' BR. No. 38.10. They are variously referred to in BR. No. 38.19 as 'alkaline pulping by-product chemicals', 'Electroplating Chemicals', 'Floatation preparations', 'Grouting Preparations not containing limestone cements', 'Stabilizing Preparations' and 'water conditioning preparations'. We request a tariff on 'concentrated sulphite lye' or lignosulphonates of 15 per cent B.P. and 20 per cent M.F.N. We request that this tariff be applicable on all lignosulphonates or 'Concentrated Sulphite Lye' when used or imported for the applications described above or for any other use."⁽¹⁾

In addition to the above proposal dealing with headings 32.01, 34.02, 35.06, 38.10 and 38.19 collectively, the company at the same time also submitted identical proposals pertaining to each of these headings separately. However, on both occasions, a spokesman for the company modified the proposal to permit continued duty-free entry of lignosulphonates used in the tanning of leather on the grounds that owing to the relatively small quantity and great variety used by the leather tanning industry, the company did not find it economical to manufacture them in Canada.

As far as the company's proposals concerning B.T.N. headings 38.10 and 38.19 are concerned, the products under discussion are specifically excluded from them; similarly, to the extent that these products are specifically provided for in heading 38.06, they do not properly belong to B.T.N. headings 32.01, 34.02 and 35.06. Consequently, concentrated sulphite lye, or lignosulphonates, appear to be properly classified by B.T.N. heading 38.06 only.

A spokesman for Lignosol expressed concern that the description "concentrated sulphite lye" in B.T.N. heading 38.06 may not adequately describe the products manufactured by his company and might be difficult to administer. He suggested that descriptions such as "lignosulphonates" or "sulphonated lignins and their salts" might be more appropriate and more consistent with North American usage.

⁽¹⁾ Transcript, Vol. 96, p. 14487; Vol. 105, p. 15831-2

Neither the Brussels Nomenclature nor the Explanatory Notes to it stipulate the degree of concentration required for admission under heading 38.06; in the absence of such a stipulation difficulties might well arise in the administration of this provision. By present tariff administration, both the unconcentrated and the concentrated product is admissible under tariff item 203.

In support of its proposal to replace the present duty-free entry with rates of 15 p.c., B.P. and 20 p.c., M.F.N., Lignosol claimed that imports from the United States, especially from Wisconsin and Washington, presented a problem to it in the Canadian market because of the extremely low prices at which the imported products were sold.⁽¹⁾ The "unrealistically low prices", the company maintained, were the result of anti-pollution legislation in the United States under which pulp and paper producers in that country are forced to dispose of their spent sulphite liquor in a way other than dumping it in rivers and streams. In addition to the highly competitive market situation at home, the company also claimed to be facing very considerable competition abroad, especially in the United States, its principal export market.

A considerable amount of Canadian and U.S. price information was made available to the Board by interested parties both during and after the public hearing. Lignosol's factory prices were reported to range between 3¢ and 8½¢ a pound, while the factory prices of one large manufacturer in the United States which exports to Canada were quoted at between 3¢ and 21½¢ a pound. However, owing to the considerable differences in the products manufactured by the various companies, the Board has been unable to make meaningful comparisons of Canadian and U.S. prices. The Board did, however, obtain some information on the factory costs of concentrating sulphite liquor to a 50 per cent solid content basis. This suggested that the conversion costs, to this stage of production, were somewhat lower for the Canadian producer than they were at least for one producer in the U.S.A. This tends to be confirmed by the fact that Lignosol has been able to export from 40 to 60 per cent of its output, most of this to the United States where it indicated that it faced a 10 p.c. tariff.

Lignosol's proposal was contested at the public hearing in November, 1962 by a spokesman for Marathon, a division of American Can Company, of Menasha, Wisconsin, which is engaged in the exportation of lignosulphonates to Canada. The company's spokesman urged that Lignosol did not require a customs tariff on the products under discussion and that their free entry into Canada should be preserved.⁽²⁾ He argued that Lignosol appeared to enjoy a healthy share of the world market and that although the Canadian company claimed to have more than adequate capacity to supply the Canadian market, there were certain Canadian requirements which could not be supplied by the lignosulphonates manufactured domestically. In support of this argument, a chief chemist of Drew Chemical Limited, of Ajax, Ontario, an important customer of Marathon and one of the largest firms in the field of boiler water additives in Canada, testified that his company tested scale inhibitors produced by Lignosol and found them less satisfactory than those purchased from Marathon.⁽³⁾

(1) Transcript, Vol. 105, p. 15894

(2) Same, Vol. 105, p. 15937

(3) Same, Vol. 105, p. 15932-3

Lignosol Chemicals made no representation, in support of the proposed B.P. rate of 15 p.c., concerning possible imports from countries under the British Preferential Tariff. Rates of 15 p.c., B.P., 20 p.c., M.F.N., were generally proposed by producers of chemicals as the level of protection that the industry considered appropriate.

SPIRITS OF TURPENTINE (GUM, WOOD AND SULPHATE) AND OTHER
TERPENIC SOLVENTS PRODUCED BY THE DISTILLATION OR OTHER
TREATMENT OF CONIFEROUS WOODS; CRUDE DIPENTENE; SULPHITE
TURPENTINE; PINE OIL (EXCLUDING "PINE OILS" NOT RICH IN
TERPINEOL) B.T.N. 38.07

Considered under this heading are the various types of liquid solvents derived from the oleoresins exuded by, or contained in, the wood of pines and other coniferous trees. Various referred to as spirits of turpentine, turpentine oils, terpenic solvents or, popularly, turpentines, the liquids are derived by distillation either directly from the oleoresins exuded by living trees or from tree stumps or waste wood reduced to chips, or as a by-product in the manufacture of wood pulp.

The distillates obtained from the oleoresins of living trees are colourless liquids with a strong odour, insoluble in water. Usually referred to as gum turpentine, or gum spirit of turpentine, these liquids are used as solvents in the manufacture of paints and varnishes, in the manufacture of reclaimed rubber and, after some further distillation, in medicine.

Steam or destructive distillation of stumps, waste wood or saw-dust yields wood turpentine, crude dipentene and pine oil. Wood turpentine is very similar in composition to gum spirits of turpentine and has a peculiar saw mill odour; it is used, together with crude dipentene - a colourless liquid with a lemon-like odour - as a solvent in the manufacture of paints and varnishes. Pine oil, obtained chiefly from stumps of long-leaf pine, ranges in colour from clear to amber and has a pleasant aroma. It is to be distinguished from pine needle oil derived by distillation from pine needles; the latter is an essential oil and as such is not under consideration in Reference 120. In Canada, pine oil appears to be used chiefly in the mineral industry as a frothing agent in the concentration of metallic ores by flotation; it is also used as a solvent for varnishes and nitrocellulose lacquers and, because of its pleasant aroma and strong dirt and grease dissolving properties, as an ingredient in the manufacture of disinfectants, polishes and soaps.

The solvents obtained as a by-product in the manufacture of wood pulp are known as sulphate and sulphite turpentine, depending on the type of chemical process used to manufacture the pulp. Sulphate turpentine is recovered during the manufacture of sulphate, or kraft, pulp mostly from jack pine or southern pine; it is the more important of the two types. Sulphite turpentine is obtained as a by-product in the sulphite digestion of spruce pulpwood; it is also known as crude para-cymene. Both types are used mostly as solvents in the preparation of paints, varnishes and related products.

All available evidence indicates that Canadian production of turpentine is relatively small and confined only to the sulphate turpentine obtained as a by-product in the manufacture of wood pulp.⁽¹⁾

(1) Transcript, Vol. 104, p. 15709; Vol. 105, p. 15942

According to published information, four firms were engaged in the production of turpentine in 1960; the Board understands that since then other pulp and paper manufacturers may have commenced production or are contemplating it. Official statistics show that Canadian shipments of turpentine increased from some 475,000 gallons valued at \$154,000 in 1956 to 726,000 gallons valued at \$257,000 in 1959; they have since declined and in 1961, the latest year for which information is available, were valued at \$79,000.⁽¹⁾

Imports of spirits of turpentine as reported in published statistics fluctuate from year to year; in recent years they have averaged about one million gallons valued at about \$600,000. However, these figures do not include pine oil imported for use in the concentration of ores. Imports of all types of oils for the concentration of ores have in recent years averaged about \$375,000 suggesting that imports of all types of turpentine, including pine oil, are valued at somewhat less than one million dollars annually.

From the foregoing it appears that the total Canadian market for the products under discussion is valued at about one million dollars annually and is supplied mostly by imports. A spokesman for a large importer and distributor of turpentines estimated at the public hearing in 1962 that only about 15 per cent of the Canadian market for the type of turpentine made in Canada is supplied domestically. Spirits of turpentine are considered for customs purposes as being of a class or kind not made in Canada.

The products under consideration are at present entered mostly under tariff items 261 and 270, both of which provide for duty-free entry under the B.P. and M.F.N. Tariffs; some may, apparently, also be entered under items 260, 791 and 711, the first two of which are also duty-free, while the third bears rates of 15 p.c., B.P. and 20 p.c., M.F.N. As the figures cited previously indicate, most of the imports are entered as spirits of turpentine, duty-free under tariff item 261. Pine oil for use in the concentration of ores is being imported duty-free under item 270; this item attracts also certain other products, such as wood tar oils, tall oil and fatty acids which are discussed under separate headings elsewhere in this report. No information is available concerning imports of turpentines under tariff items 260, 791, and 711.

The Industry Committee proposed that B.T.N. heading 38.07 be adopted for the purpose of classifying the products under discussion. The Committee did not make a proposal with respect to rates of duty, but confined itself to endorsing the request for duty-free entry under the two main Tariffs made by Harrisons & Crosfield (Canada) Ltd., whose submission is discussed below.

B.T.N. heading 38.07 would attract all of the turpentines now entered under tariff item 261, as well as the pine oil for use in concentration of ores now classified under item 270. It would also attract any turpeneic solvents that may at present be entered under item 260. However, this latter item relates principally to the raw oleoresins, or gums, from which spirits of turpentine are derived. Such materials

⁽¹⁾ D.B.S., Cat. Nos. 31-201, 31-211, 46-502

are not covered by heading 38.07 and no provision for them was proposed by the Industry Committee nor anyone else; under the Brussels Nomenclature they are classifiable under heading 13.02.

Harrisons & Crosfield (Canada) Ltd., of Toronto, proposed duty-free entry under both the British Preferential and the Most-Favoured-Nation Tariffs for the products classifiable under B.T.N. heading 38.07. The firm claims to be a large importer of the commercial materials covered by this heading. In support of its request for continued duty-free entry the company stated in its submission:

"Canada simply lacks the raw materials for the production of the commercial pine derivatives which make up the greater part of the substances covered by B.N. heading 38.07. While turpentine of one type is produced it is strictly a by-product and represents only about 15 per cent of the country's requirement."⁽¹⁾

In a submission made on behalf of Dominion Rubber Company Limited, the Rubber Association of Canada observed that: "Terpenic solvents are not made in Canada and requirements are imported from the United States."⁽²⁾

In a letter to the Board dated October 8, 1962, the Hercules Powder Company (Canada) Limited of Montreal, stated:

"Our affiliate, Hercules Powder Company, exports pine oil to a Canadian distributor who sells exclusively to the mining industry of Canada. Our product currently enters under Tariff Item 261, tariff duty free, MFN. Since the Canadian mining industry requires pine oil to compete successfully in world markets for their products and since pine oil is not produced in Canada, it is recommended that pine oil remain free of duty."⁽³⁾

The Consolidated Mining & Smelting Co. of Canada, Limited, of Montreal, urged the continuation of end-use item 270, under which is imported, among other products, the pine oil which the company uses in the floatation separation of ores.⁽⁴⁾

In a general submission respecting tariff item 270, Canadian Chemical Company, Limited, of Montreal, requested that if the facts indicate a large measure of interchangeability in use between the frothers made by the company and imported oils used for the same purpose, item 270 should be deleted.⁽⁵⁾ With respect to this submission, a spokesman for the Canadian Metal Mining Association testified at the public hearing that pine oil and a product known as "Dowfroth" (identified as a polypropylene glycol methyl ether) were the main frothing agents used, and that these were not replaceable by the products available from domestic production.⁽⁶⁾

(1) Transcript, Vol. 105, p. 15946-7

(2) Same, Vol. 104, p. 15664

(3) Same, Vol. 105, p. 15955

(4) Same, Vol. 88, p. 13417-8

(5) Same, Vol. 89, p. 13608

(6) Same, Vol. 89, p. 13614

Similar evidence was offered by the Hercules Powder Company which, in the letter dated October 8, 1962, advised the Board as follows:

"For many years as a major producer and exporter of pine oil into Canada for use as a frother by the Canadian mining industry, the Hercules Powder Company knows of no major Canadian mining company that has found ... any frother used in Canada to be interchangeable with pine oil on a performance and/or price basis."(1)

The company estimated that pine oil accounts for some 70 per cent of the total Canadian market for frothers.

(1) Transcript, Vol. 105, p. 15954

ROSIN AND RESIN ACIDS, AND DERIVATIVES THEREOF
OTHER THAN ESTER GUMS INCLUDED IN HEADING NO. 39.05;
ROSIN SPIRIT AND ROSIN OILS - B.T.N. 38.08

Classified under this heading are rosin and certain products obtained by extraction from, or treatment of, rosin. Rosin, also known as colophony, gum rosin, pine rosin or other wood rosin, is the residue obtained in the distillation of oleoresins after the separation of the volatile spirits of turpentine, discussed under the previous heading. The term is sometimes used in commerce for the co-product obtained along with fatty acids, from the fractionation of tall oil. Rosin itself is not discussed here to any extent as it is at present classified under tariff item 584, which is not before the Board in Reference 120.

Resin acids are the chief constituents of rosin, accounting for as much as 95 per cent of its total volume. There are several closely related types of resin acids, by far the most important of which is abietic acid. However, complete separation of the individual acids is difficult and is seldom carried out in commercial production with the result that most resin acids sold commercially are mixtures; they are referred to generally as "abietic acids". The commercial grades of resin acids are obtained either by crystallization directly from rosin, or by distillation from tall oil. They are usually in the form of yellowish powders and are used mostly in the manufacture of synthetic resins, paper sizes and of the various derivatives described below.

The Board has been informed that resin acids containing impurities similar to those found in rosin would at present be classified as rosin under tariff item 584 which, as already noted, is not before the Board in Reference 120. However, it appears that the amount of impurities that has to be present in resin acids in order that they be considered rosin within the meaning of tariff item 584 has never been specified; such products apparently are classified chiefly on the basis of the descriptions and commercial specifications under which they are sold. In view of this, it is impossible to ascertain with any degree of accuracy to what extent the resin acids encompassed by B.T.N. heading 38.08 are properly before the Board in this Reference, and to what extent they are not.

The derivatives of rosin and of resin acids include modified rosins, salts and esters of resin acids, rosin spirit and rosin oil.

The principal modified rosins include oxidised, hydrogenated, disproportionated, or dehydrogenated, polymerised and hardened rosins. Their manufacture involves processes such as heating, boiling or reacting the rosin with other substances; it is designed to modify the rosin or to endow it with certain desired characteristics, such as hardness, viscosity or resistance to light, oxidation or crystallization. Modified rosins are used in the preparation of varnishes, paints, inks, glues and soaps.

Salts of resin acids, or inorganic resinates, may be obtained directly from rosin, from resin acids or from modified rosin by boiling, precipitating, fusing or other treatment in the presence of metallic

salts or oxides. Such treatment yields inorganic resins, including aluminum, calcium, cobalt, copper, manganese, lead, potassium, sodium and zinc resins, which are used in the preparation of driers for paints and varnishes, and in fungicides and disinfectants.

Esters of resin acids are also obtained directly from rosin, from resin acids or from modified rosins, usually by treatment with acetic acid. Compounds obtained in such a way include methyl, ethyl and benzyl esters, and methyl hydroabietate. These products find applications in the manufacture of lacquers, varnishes, rubber and linoleum, and in the preparation of sizing for textiles.

Rosin spirit, also known as rosin essence, is obtained during the distillation of rosin; it is used in paints, varnishes, and as a solvent for resins in general. The distillation process also yields rosin oils; these, although covered by B.T.N. heading 38.08, are not under discussion as they are at present classified under tariff item 266, which is not before the Board in this Reference.

Apart from a statement by a spokesman for the Industry Committee suggesting that some of the derivatives of rosin might well be made in Canada,⁽¹⁾ there is no evidence to suggest that any of the products within Reference 120 are, in fact, manufactured in Canada at the present time. Rosin from tall oil, which is not before the Board, is made in Canada, principally for captive use in preparing rosin sizing, by Hercules Powder Company (Canada) Limited. Imports of resin acids, salts of resin acids, and of rosin spirit, together with rosin oils, were recorded for the first time in 1964 when they were valued at about \$1.7 million, all from the United States. Imports of rosin oils prior to 1964, when they were reported separately, ranged between \$50,000 and \$100,000, suggesting that most of the imports reported in 1964 likely consist of products under discussion. No information is available concerning imports of modified rosins and of esters of resin acids.

The products under consideration are at present classified for Customs purposes mostly as follows:

<u>Product</u>	<u>Tariff Item No.</u>	<u>Rates of Duty</u>	
		<u>B.P.</u>	<u>M.F.N.</u>
Resin acids:			
-abietic, for use in the manufacture of synthetic resins	923	Free	Free
-other (commercial grade)	584	Free	Free
Derivatives:			
-modified rosins	901(a)7	Free	Free
-salts and esters of resin acids:			
-for use in the manufacture of pesticides	791	Free	Free
-for use in the manufacture of synthetic rubber	851	Free	Free
-for use in the manufacture of plastic products	921	Free	Free

(1) Transcript, Vol. 105, p. 15968

<u>Product</u>	<u>Tariff Item No.</u>	<u>Rates of Duty</u>	
		<u>B.P.</u>	<u>M.F.N.</u>
Derivatives: (Cont'd)			
-other	208t	Free	15 p.c.
-rosin spirit	261	Free	Free

No information is available concerning the distribution of imports among the various tariff items. However, of the \$1.7 million of imports cited previously, only some \$219,000 were dutiable; the duty collected was 16.4 per cent of that value; some may be entered as mixtures under tariff item 220a at 20 p.c., M.F.N., and some possibly is not classified to B.T.N. heading 38.08. It is believed that the dutiable imports consist mostly of salts of resin acids, or resinsates, as all of the resin acids themselves appear to be entered duty-free under tariff item 923, as is rosin spirit under item 261.

The Industry Committee proposed that B.T.N. heading 38.08 be adopted for the purpose of classifying the products under discussion. For those products covered by this heading which are properly before the Board, namely resin acids, the various derivatives of rosin and of resin acids, and rosin spirit, the Industry Committee proposed rates of 15 p.c., B.P. and 20 p.c., M.F.N.; as noted above, most of these products are at present duty-free. In explanation of this proposal, the Committee stated that the only product respecting which it had received a specific recommendation for duty rates was rosin, not before the Board in Reference 120, and that it had therefore recommended for heading 38.08 the same levels of duty as had been recommended generally for other products of the Canadian chemical industry.(1)

With respect to the products covered by heading 38.08 which are not under review in Reference 120, namely the rosin now entered duty-free under item 584 and the rosin oils entered duty-free under item 266, the Industry Committee proposed that they be relocated under this heading, with continued duty-free entry.

In a written submission, Nuodex Products of Canada, Limited, of Toronto, requested that metallic resinsates, especially those of lead, cobalt, manganese, calcium and iron, be considered as driers and be subject to the tariffs which the company proposed, jointly with Dussek Brothers Canada Limited, of Belleville, Ontario, in a submission on B.T.N. heading 32.11 pertaining to prepared driers. An identical request concerning metal resinsates was also made by Dussek Brothers in a letter to the Board dated November 7, 1962. In support of their proposals, the two companies observed that while metallic resinsates were no longer used extensively as driers, having been replaced almost entirely by driers made from naphthenic acid or synthetic acids, it would possibly save confusion if they were to be considered as driers and subject to the same rates of duty.

In their joint submission respecting B.T.N. heading 32.11, the two companies proposed rates of 20 p.c. under both the British Preferential and the Most-Favoured-Nation Tariffs. At present, metallic

(1) Transcript, Vol. 105, p. 15960

resinates for use in the manufacture of prepared driers are understood to be classified under tariff item 208t, duty-free under the British Preferential Tariff and at the rate of 15 p.c. under the Most-Favoured-Nation Tariff.

Resinates are specifically excluded from B.T.N. heading 32.11. As noted during the discussion of the two companies' joint proposal respecting this heading, it is not altogether certain whether the description proposed by them would, in fact, attract metallic resinates under this heading. No mention of metallic resinates was made at the time of the two companies' submission on B.T.N. heading 32.11.

The Canadian Paint Varnish and Lacquer Association Incorporated (CPVLA) made representations concerning certain rosin derivatives used in the manufacture of decorative and protective coatings, including polymerized and hydrogenated rosins, and hydrogenated methyl ester of rosin. All of these products are at present entitled to duty-free entry under tariff item 901(a)7 and the Association urged that duty-free entry be continued until they are made in Canada.

The spokesman for the CPVLA testified that the products under discussion were at present not available in Canada and that all of the industry's requirements were being obtained from the United States.(1) A survey(2) of raw materials conducted by the CPVLA among its members suggest that the rosin derivatives used in the manufacture of decorative and protective coatings were in 1961 valued at about \$45,000. In addition, a spokesman for the Association indicated that a substantial portion of the rosin used by the industry, which in 1961 was valued at about \$310,000, consisted of the derivatives under discussion, suggesting that the total value of rosin derivatives used in the manufacture of decorative and protective coatings came to somewhat less than \$355,000 in 1961; this was equivalent to less than 0.5 per cent of the total value of materials used by the industry during that year.

Harrisons & Crosfield (Canada) Ltd., of Toronto, requested that modified rosins, rosin esters, esters of modified rosins, and rosin esters modified with dibasic acids and with phenol-aldehyde be allowed continued duty-free entry under tariff item 901(a)7 until they are made in Canada.(3) Some of the modified rosins, rosin esters and esters of modified rosins are classifiable under B.T.N. heading 38.08, while others as well as most of the rosin esters modified with dibasic acid and with phenol-aldehyde appear to be more properly covered by B.T.N. headings 39.01 or 39.05. Most of those which fall properly under the present heading are at present entered duty-free under tariff item 901(a)7; other tariff items that might apply include items 851, 921 and 208t.

The company also made a specific request that hydroabietyl alcohol, commercially known as abitol, be permitted duty-free entry under tariff item 901(a)7.(4) This product is obtained by hydrogenation of methyl ester resinate and is used as a plasticizer and

(1) Transcript, Vol 161, p. 23923

(2) Same, Vol 93, p. 14168-85

(3) Same, Vol. 161, p. 23880-1

(4) Same, Vol. 161, p. 23881

tackifying agent in printing inks and adhesives. The company stated that abitol was at present entitled to duty-free entry under tariff item 921, if for use in the manufacture of synthetic resins, and was otherwise dutiable under item 711; however, the Board understands that hydroabietyl alcohol for uses other than in the manufacture of resins and plastics would, at present, be classified under item 208t, rather than 711. Under the Brussels Nomenclature the product appears to be properly classifiable as an ester under heading 38.08.

In support of these proposals, Harrisons & Crosfield noted that, to its knowledge, none of the products mentioned in its submission were made in Canada.⁽¹⁾ The company's interest in these products is that of an importer and distributor.

In its representations pertaining to B.T.N. heading 39.05, Minnesota Mining and Manufacturing of Canada Limited, of London, Ontario, requested that limed rosin be allowed duty-free entry until such time as it is made in Canada.⁽²⁾ It appears that limed rosin is properly classified under B.T.N. heading 38.08 rather than 39.05 and, consequently, this representation is considered under the present heading. At present, limed rosin is understood to be admitted duty-free under tariff item 901(a)7 and thus the company's proposal does not involve any change in rates.

Representations were received from Hercules Powder Company (Canada) Limited, of Montreal, concerning emulsifiers derived from rosins and used in the manufacture of synthetic rubber. These emulsifiers were said to be composed of sodium or potassium salts of rosin and/or disproportionated rosin. The company urged that they be allowed duty-free entry under B.T.N. heading 38.08 as salts of resin acids. At present these products are entitled to duty-free entry under tariff item 851.

Hercules Powder at present imports the emulsifiers from its parent company in the United States for distribution to the rubber industry in Canada. In support of its request for continued duty-free entry the company stated:

"The market for these emulsifiers in Canada is limited to the synthetic rubber industry which is currently not sufficient to warrant our producing these products in Canada. Since there are no competitive products produced in Canada for this use, it is our belief that to encourage the expansion of our synthetic rubber industry, a duty-free status be maintained for these materials."⁽³⁾

(1) Transcript, Vol. 161, p. 23873

(2) Same, Vol. 162, p. 24096

(3) Same, Vol. 90, p. 13710

WOOD TAR; WOOD TAR OILS (OTHER THAN THE COMPOSITE SOLVENTS AND
THINNERS FALLING WITHIN HEADING NO. 38.18):
WOOD CREOSOTE; WOOD NAPHTHA; ACETONE OIL - B.T.N. 38.09

The products of this heading are generally obtained by the distillation of resinous or non-resinous woods. They include: wood tar, tar oils, creosote, naphtha and acetone oil.

Wood tar is a by-product obtained in the course of destructive distillation of wood. The only commercially important wood tar that may be before the Board in Reference 120 is hardwood tar obtained from non-resinous woods, such as beechwood. This is a thick, brownish-black liquid, most of which is further processed to yield derivatives such as tar oils, creosote and pitch. It is imported under tariff item 711 which is before the Board in so far as it relates to chemicals and plastics. However, of by far the greatest commercial importance is the tar obtained from pine wood, generally known as pine tar. This product appears to be at present imported mostly, if not exclusively, under tariff item 585; this item is not before the Board in Reference 120. It is also admissible, as is beechwood creosote, under item 208t, if it is of a grade described in a pharmacopoeia.

Wood tar oils are obtained during the distillation of either soft or hardwood tars, pine tar oils being the more common. They range in colour from reddish-brown to dark-brown, have a strong, tarry odour and are poisonous. Tar oils are used in the manufacture of paper, paints and varnishes, insecticides, reclaimed rubber and in ore flotation.

Wood creosote is obtained by the destructive distillation of wood tar, mostly beechwood tar. It is a colourless, oily liquid, with a smoky odour; it is used chiefly as a disinfectant or antiseptic, as an ore flotation agent and in medicine.

Wood naphtha is described in the Explanatory Notes to the Brussels Nomenclature as a yellowish liquid with an empyreumatic⁽¹⁾ odour usually containing 70-90 per cent methanol (methyl alcohol) with varying proportions of acetone and other ketones; it is said to be obtained by processing pyroligneous liquids.⁽²⁾ The term wood naphtha does not appear to be in use in North America, its nearest equivalent being wood alcohol. Although wood alcohol, also known as natural or crude methyl alcohol, apparently has been of some commercial importance, it is understood to have been replaced by methyl alcohol made synthetically; this product, usually referred to as methanol, is considered in the part of the report dealing with the products of B.T.N. heading 29.04.

Acetone oil is an oily residue from the distillation of acetone. The oil, which varies in colour from yellow to brown and has a penetrating odour and acrid taste, is used as a denaturant of alcohol.

(1) Tasting or smelling of burnt organic matter

(2) These are liquids obtained during the distillation of wood; sometimes known as raw pyroligneous acid, they are a mixture of methanol, acetic acid, acetone, furfural and various tars and related products

There is no known Canadian production of any of the products considered in this section, nor is there evidence that they are of commercial importance at the present time. Imports are not reported separately.

At present the products before the Board in Reference 120 are classifiable for customs purposes mostly as follows:

<u>Product</u>	<u>Tariff Item No.</u>	<u>Rates of Duty</u>	
		<u>B.P.</u>	<u>M.F.N.</u>
Hardwood tar	711	15 p.c.	20 p.c.
Wood tar oils and wood creosote:			
- for use as pesticide	219a(1) or 219a(2)	Free	12½ p.c.
- for use in the manufacture of pesticides	791	Free	Free
- for use in the concentration of ores	270	Free	Free
- Beechwood creosote, B.P. Grade	208t	Free	15 p.c.
- other	711	15 p.c.	20 p.c.
Wood naphtha (wood alcohol), per proof gal.	158	20¢	20¢
Acetone oil	711	15 p.c.	20 p.c.

No information is available concerning the value of any of these products that may be imported under the various tariff items.

The only representations received by the Board were those of the Industry Committee. The committee proposed that rates of 15 p.c., B.P. and 20 p.c., M.F.N., generally recommended by it for chemicals, be applied to all of the products of B.T.N. heading 38.09 which fall within the scope of Reference 120. With respect to those products covered by this heading which are not properly before the Board, the Industry Committee requested that they be relocated within the framework of heading 38.09 in order to preserve the entirety of its classification structure. (1)

(1) Transcript, Vol. 105, p. 15975

VEGETABLE PITCH OF ALL KINDS; BREWERS' PITCH AND
SIMILAR COMPOUNDS BASED ON ROSIN OR ON VEGETABLE PITCH;
FOUNDRY CORE BINDERS BASED ON NATURAL RESINOUS PRODUCTS
- B.T.N. 38.10

The vegetable pitches covered by this heading are the residues obtained during the distillation or other treatment of vegetable substances. They include the wood tar pitches obtained as a residue in the distillation of wood tar, the rosin pitch left over after the extraction of rosin spirit and rosin oil from rosin, and the sulphate, or tall oil, pitch which is a by-product of the distillation of tall oil. Such pitches are very viscous, semi-solid to solid substances ranging in colour from yellowish brown to black. They find application in a variety of uses including caulking of ships and other watercraft, water-proofing fabrics, impregnating woods and in the manufacture of reclaimed rubber.

Of the three basic types of vegetable pitches described above, only the sulphate, or tall oil, pitch is under consideration in this section. Pine pitch, the only commercially significant type of wood pitch, is specifically provided for in existing tariff item 585, which is not before the Board in Reference 120. Similarly, rosin pitch does not appear to fall within the scope of this Reference as it is, apparently, classified for customs purposes as pine pitch under tariff item 585. This item also provides for burgundy pitch, which is specifically excluded from B.T.N. heading 38.10, being classifiable with gums and resins under heading 13.02.

The related compounds under discussion include preparations based on vegetable pitch or other natural resinous substances, with an admixture of various other materials. The principal of these are: brewers' pitch, usually a mixture of rosin, paraffin wax and rosin oil, used for coating interior walls of beer barrels; cobblers' was, generally prepared by mixing rosin, rosin oil, paraffin wax, ozokerite and talc or kaoline and used for waxing yarns and twines for sewing footwear and harness; caulking pitch, a fused preparation consisting of wood pitch, wood tar and rosin, which is used for caulking ships and other watercraft; and foundry core binders, consisting of rosin or similar natural resinous substance mixed with sand and other materials and used in the preparation of foundry moulds. All of these products are at present classified under tariff items which are before the Board in Reference 120.

Of the products under consideration in this section, tall oil pitch appears to be the only one which is made in Canada at the present time. A spokesman for Hercules Powder Company (Canada) Limited mentioned it during the presentation of the company's submission on tall oil as one of the products which the company makes in Canada and has available for sale.⁽¹⁾ However, he also testified that "a considerable portion of our pitch is burned..."⁽²⁾ Hercules Powder did not make any proposals concerning the rates of duty on tall oil pitch.

(1) Transcript, Vol. 104, p. 15708

(2) Same, Vol. 104, p. 15717

Imports of tall oil pitch are, for statistical purposes, included with those of tall oil. A survey conducted by the Department of Industry revealed that, during the second half of 1964, tall oil pitch accounted for less than 0.2 per cent of the total value of imports under the relevant class;⁽¹⁾ this suggests that imports of tall oil pitch were probably valued at about \$1,200 in 1964.

There is no evidence indicating that any of the other products under discussion are at present manufactured in Canada, nor is there any information available concerning their imports.

Tall oil pitch is at present specifically provided for in tariff item 585a, duty-free under all three Tariffs; as noted above, imports are negligible. The other products under consideration would at present be mostly dutiable at 15 p.c., B.P., 20 p.c., M.F.N. under tariff items 220a and 711.

In its statement on B.T.N. heading 38.10 the Industry Committee proposed as follows:

"In the absence of other submissions, the Committee recommends for products of Heading 38.10 that are within Reference 120, the same levels of duty treatment as have been recommended generally for other products of Canadian chemical industry. For any products of Heading 38.10 which now lie outside the scope of reference 120, the Committee recommends that the tariffs applicable to them be relocated within the framework of Heading 38.10 in order to preserve the entirety of its classification structure."⁽²⁾

In so far as the products which are within the scope of Reference 120 are concerned, the principal effect of the Industry Committee's proposal would be the imposition of rates of 15 p.c., B.P. and 20 p.c., M.F.N. on tall oil pitch, now entered duty-free under tariff item 585a. For any products of B.T.N. heading 38.10 which are not in Reference 120, the Committee requested that they be relocated under it at existing rates.

The Industry Committee noted in its statement that it had not received any proposals from members of the industry concerning the products of B.T.N. heading 38.10.⁽³⁾

In a written submission, the Rubber Association of Canada requested that tall oil pitch remain free of duty as at present.⁽⁴⁾ The Association noted that tall oil pitch was important to the domestic rubber industry as one of the materials used in the manufacture of re-claimed rubber, of which Dominion Rubber Co. was said to be the only Canadian manufacturer.

(1) Department of Industry, Import Analysis Division, Import Survey I.A. Div. 40-65

(2) Transcript, Vol. 105, p. 15981-2

(3) Same, Vol. 105, p. 15981

(4) Same, Vol. 104, p. 15665

DISINFECTANTS, INSECTICIDES, FUNGICIDES, WEED-KILLERS, ANTI-SPROUTING PRODUCTS, RAT POISONS AND SIMILAR PRODUCTS, PUT UP IN FORMS OR PACKINGS FOR SALE BY RETAIL OR AS PREPARATIONS OR AS ARTICLES (FOR EXAMPLE, SULPHUR-TREATED BANDS, WICKS AND CANDLES, FLY-PAPERS) - B.T.N. 38.11

The Products

The products included in this part of the report are disinfectants, insecticides, fungicides, weed-killers, anti-sprouting products, rat poisons and similar products, used to combat or destroy insects, pests, fungi and other biological organisms which produce harmful effects on agriculture, industrial property and in households. These products are preparations or formulations, in liquid or powdered form, sold in bulk or in retail packages. Products not covered by this section of the report are preparations in which pesticidal properties are subsidiary, such as anti-fouling marine paints, disinfectant soaps, wax polishes or medicaments - including veterinary medicine and deodorants which are not pesticides. Also not covered here is nicotine or salts of nicotine, unless put up in packages for sale by retail. Any separate chemically defined compounds used in the above products and on which the Board received submissions are dealt with in their appropriate sections of the report.

The market in Canada for the products included in this section is in excess of \$35 million a year.

A wide interest was shown before the Board by formulators of pesticides, by manufacturers of ingredients and by users of the preparations. Nineteen submissions were made to the Board on pesticides and related preparations. These are dealt with more fully under Tariff Considerations below but, in brief, they were expressions of the following type of interests: large-scale formulators, small-scale formulators, manufacturers of agricultural chemicals, individual companies that manufacture, import or distribute a particular range of the products or the containers for them, and representations of large-scale user interests. Many of the companies requested protection on a particular group of products which they made, while supporting free entry for a wide range of basic ingredients which were generally recognized as not being available from Canadian production.

The products which comprise the scope of this inquiry are generally referred to in this report as pesticides except where there is reason to refer more precisely to the function of one or another group of products. They include the types of products mentioned in the first paragraph, and also lampricides, slimicides, repellants, defoliants, and such articles as sulphur-treated bands, sticks and candles, and fly-papers.

In Canada, all pesticides manufactured, imported or offered for sale are required to be registered by brand under the Pest Control Products Act. This requirement applies to all such products unless they are for export or are supplied by prescription and are not for resale in Canada. In 1964, there were 3,639 products registered under the Act compared with 3,000 in 1958. Their number varies from year to year as new products are introduced and some older products are deleted.

According to the Pest Control Act, a pest control product is a product used for, or represented as a means of, preventing, destroying, repelling, mitigating or controlling, directly or indirectly, any insect, fungus, bacterial organism, virus, weed, rodent, or other plant or animal pest. The products are sold in Canada in the form of dust, solid or wettable powder, aerosol bombs and certain types of liquids.

More than 50,000 species of insects and pests are said to occur in Canada and there are hundreds of chemical compounds used to combat or destroy them.⁽¹⁾ Newer and more effective products are continually appearing on the market, as the pests have a tendency to become immune to the existing ones. Intensive research and development is being conducted throughout the world to produce these new products.

The most popular herbicide is 2,4-D (2,4-dichlorophenoxyacetic acid) and the most popular insecticide is DDT (Dichloro-diphenyl-trichloroethane). Information on the principal types of products and their uses is presented below.

The term "pesticides" is used as a general term to encompass all products of this part of the report.

The term "disinfectants" is used to refer to substances that destroy or control harmful micro-organisms. Common disinfectants include preparations of phenol, cresol, coal-tar distillates, formaldehyde, pine oil, mercurial and chlorinated compounds, hypochlorites and hydrogen peroxide. The effectiveness of a preparation is often expressed in terms of a phenol coefficient.

The term "insecticides" is used to refer to substances that destroy or control insect pests. Some of these substances, such as lead arsenate and sodium fluoride, are stomach poisons; some, such as DDT, chlordane and organic phosphate compounds such as parathion, are contact poisons. This latter group also encompasses fumigants, for example paradichlorobenzene and methyl bromide.

Fungicides are a means of controlling a fungus either by protecting against its growth or by destroying it. Certain copper, mercury or phenolic compounds are frequently used for the former, while formaldehyde, lime sulphur, dinitro compounds or quarternary ammonium derivatives might be used for the latter.

Weed-killers destroy unwanted plant life, either on a selective or on a non-selective basis. Compounds such as sodium arsenite, sodium chlorate and ammonium thiocyanate are among the active ingredients used in a non-selective manner, particularly where the objective is to keep soil barren as, for example, along a railroad. A variety of organic compounds are used as selective weed-killers, the best known being the various 2,4-D compounds. Others include carbamates, chlorinated acids and phenols.

(1) George S. Brady, Materials Handbook, Ninth Edition; McGraw-Hill Book Company, Inc., New York, Toronto, London, p. 391, and Transcript, Vol. 107, p. 16225

Within the above broad categories and in addition to them there are complex arrays of formulations, many substitutable in whole or part for one another using similar or different means of application, under similar or different conditions.

Although the history of pest control goes at least as far back as the plagues of Egypt when insects such as locusts caused heavy damages to the crops, it has received particular attention since the mid-19th century when the scientific study of the organisms known as plant enemies began. Significant developments took place during World War II with the discovery of DDT and weed-killing hormones such as 2,4-D, 2,4,5-T, (2,4,5-T-trichlorophenoxyacetic acid) and MCP (2-Methyl-4-chlorophenoxyacetic acid). Prior to these discoveries, pesticides were few in number and confined mostly to simple organic chemicals and some naturally occurring organic materials of vegetable origin.

The use of pesticides increased greatly during the War, and the need for newer types of pesticides, arising from the immunity of certain pests, fostered basic research especially involving synthetic organic products. As a result, there have been continuous additions to the chemicals available for pesticidal use.

The latest development in this field is the use of carbamates. They form a new group of organic chemicals, successful in killing insects which had become immune to other poisons. However, a particular carbamate might kill only a narrow spectrum of insects, and is therefore limited in its use. Certain carbamates, for example, are used specifically for flies, aphids and lepidoptera, while others are being developed specifically for mites and other insects.

Because of the adverse side effects of the indiscriminate use of pesticides, the federal and provincial authorities have regulations for the use of pesticides, and industry is also seeking ways to control their use and to develop products with less side effects. Efforts are being made by government agencies and by industry to develop less toxic chemicals.

Other approaches to the control of pests are being tried; sex and food lures for insects have been developed to attract them to selected areas for destruction. Other developments of recent origin consist of viruses that kill insects resistant to most pesticides, and sterilizers to stop the reproductive cycle of the breeding insect population. Experiments are reported in the use of diseases against specific kinds of insects, such as the cabbage looper, an insect harmful to a wide range of crops and resistant to many insecticides. A virus that kills the loopers is being produced in quantity. Also in the stage of experimentation is the use of "good" parasites and predators, produced and released in thousands to prey on pests.

It was pointed out by spokesmen for the pesticides industry that extensive research and experimentation, together with changing government regulations, add to the costs of producing and marketing insecticidal products.

Raw Materials and Processes of Manufacture

The attached chart shows the stages of manufacture of pesticides from the raw materials to the finished product. Beyond the manufacture of the basic, biologically active ingredients, there are two main operations; one is formulating - bringing the raw materials together to make preparation - and the second is packaging them in the form of finished products, with proper labelling to show their ingredients, directions for their use and precautions to be taken.

The raw materials used in the manufacture of pesticides can be grouped under four headings:

- (a) biologically active ingredients,
- (b) synergists,
- (c) conditioners, and
- (d) packaging materials.

Biologically active ingredients are the materials that destroy pests. These materials can be botanicals, derived from vegetable sources, or chemicals and chemical compounds. Synergists, such as citric or maleic acid or ferrocyanides, are non-biologically active materials used to make the first group of materials more active. Conditioners are materials to make the pesticide more effective. They include, for example, solvents, adhesives to make the pesticide stick, carriers to convey the active ingredient in a suitable form to the pest, diluents for standardizing the preparation, emulsifiers to keep the product in solution for application and propellants to expel it from the container. Packaging materials include containers, labels and so on. The basic ingredients used for pesticides meant for agricultural, household or industrial use are generally the same. A list of the principal raw materials used in the manufacture of pesticides is given in Appendix III.

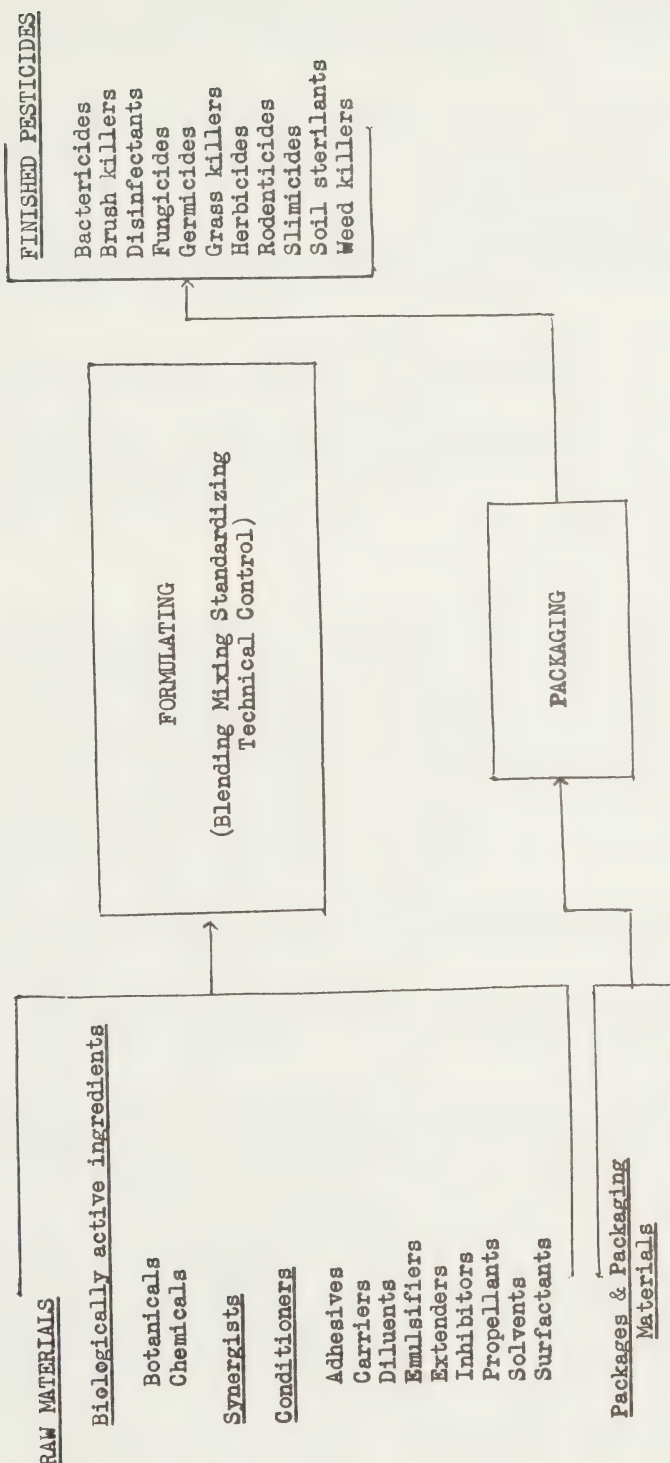
Although the percentage of the Canadian-made active ingredients used in the industry is not large, there are some important Canadian-made ingredients. These include: herbicides such as 2,4-D and 2,4,5-T acid and esters and M.C.P. esters; thiram and nabam for fungicides and seed treatment; naphthalene for moth preventatives and amino used in warfarin for rodenticides. Other important, active ingredients are imported mainly from the U.S.A., but some come from Europe. The industry, however, uses large quantities of Canadian solvents, diluents and containers including steel drums, steel and fibre cans, glass bottles and various kinds of bags. One spokesman stated in the public hearing that:

"It is our contention for every \$6 to \$7 - worth of formulations sold it will require an expenditure of approximately \$1 for Canadian-made materials and packages." (1)

As most of the companies that formulate pesticides also produce other chemicals, data are not available showing separately the value of raw materials used in the manufacture of pesticides. However, since a very large part of the biologically active ingredients

(1) Transcript, Vol. 108, p. 16378

THE MANUFACTURE OF PESTICIDES



and concentrates used in pesticides is imported, it is estimated, from import data, that the total use of biologically active materials is in excess of \$10 million a year.

A special survey conducted by the Board on imports under Tariff item 791, materials for use in the manufacture of pesticide preparations, showed imports valued at nearly \$3,400,000 during the six-month period, from October 1961 to March 1962. The chemicals which constituted more than one half of the above total were: herbicides and weed-killers (2,4-D Acid, Aldrin, Guthion 25%, MCP Flake Acid and Monochloroacetic Acid); insecticides (DDT technical, Dieldrin 100%, Endrin, Petroleum Distillates) and fungicides.

With respect to the formulating process, a spokesman for the pesticide manufacturers noted:

"The preparation of pesticides involves much formulation work and formulation may be carried out in successive stages. It may be a case of taking product A and blending with product B to make preparation C, which is not in itself a pesticide until it has been blended with product D which has been obtained by mixing E, F and G."

He continued, later:

"The actual plant operations involved in formulating pesticides are as follows. Grinding. This means grinding materials to an extreme fineness. This is done mechanically, or by what is called air milling. We react liquids with solvents, and liquids with liquids. We absorb liquids on fine dry materials, and absorb liquids on coarse material. We call this type granular material in contrast to the fine state of the other. We dissolve liquids in liquids. We dissolve solids in liquids, and of course we mix one dry material with another dry material, and obviously the packaging...some of these operations are simple. Others are quite complex, and it depends on your plant equipment where semi-processed or semi-formulated materials start to come into the operation."(1)

The equipment required for formulation is relatively inexpensive by the standards of many chemical operations. In regard to herbicides it was stated that:

"the actual formulation of hormone herbicides such as 2,4-D; 2,4,5-T and M.C.P., or products such as Fly Sprays or products such as DDT, Endrin, and Dieldrin emulsions, do not require special or expensive equipment to formulate them."(2)

The plants used for formulation of pesticides are quite flexible, and often can be switched from the blending or mixing of one product to the formulating of another. Raw materials constitute an important part of the cost of production of pesticides. Biologically active ingredients were said to comprise 50 to 80 per cent of the cost of production of the finished product; inerts, carriers, solvents,

(1) Transcript, Vol. 108, p. 16281, 16297

(2) Same, Vol. 109, p. 16505

packaging, labour and plant overhead account for the rest. Labour cost was stated to be proportionally small, even less than packaging costs which were placed by one spokesman at $7\frac{1}{2}$ to 10 per cent of the total.

The packaging costs for products sold in small packages are much higher.

"The majority of the sales of these [household] products are in packages of 1 lb. and less, and the costs of packaging and distribution represent much higher proportions of the total costs of the products than in the case of commercial pesticides." (1)

The use of basic ingredients or preparations (concentrates) depends on the formulator's type of operation. A formulator with a broad range of facilities, or large volume, may buy basic materials and not preparations; a company with limited facilities can buy preparations and simply put them into final product form, possibly by simple dilution and packaging.

The Industry

The pesticides formulating industry in Canada is comprised of companies engaged principally in three different types of operations, apart from the few companies that make some of the biologically active materials. Some plants blend the basic biologically active ingredients and mix and package the preparations; some import concentrated materials, dilute them and package them in finished products and, lastly, some import and re-sell preparations without performing any processing except possibly packaging them into smaller containers. Some companies in the industry are engaged in all three types of operations, while other companies perform only some of the later stages.

In 1964, there were 304 firms registered under the Pest Control Products Act, as formulators, packagers or retailers. Of these 304 firms, only 165 were reported to have sales in excess of \$10,000 a year, and these were said to account for an estimated 95 per cent of total sales of pest control products in Canada. It is a feature of the pesticides business that competition can come either from a large-scale national producer of a full line of products, or from a very small firm supplying one or more specialized products in a restricted market area. Thus, a large-scale firm with complex facilities, requiring substantial capital investment and many employees, may be in competition with similar types of companies as well as with a number of small-scale establishments buying materials or preparations in bulk, either from domestic suppliers or from abroad, and employing only three or four persons to bottle or package the product for sale.

At the public hearing in November 1962, 31 producing companies were represented either individually or in groups. Seven companies were large-scale formulators; nine made a joint submission as formulators principally of household-type insecticides, eight companies made statements as producers in Canada of biologically-active ingredients or other

(1) Transcript, Vol. 108, p. 16331

basic materials for pesticides; the rest were formulators or importers of a limited range of products, or producers of emulsifiers and other chemicals and packaging materials. The list of these companies is attached as Appendix IV. The seven companies which made a submission as large-scale formulators and which were said to account for about 50 per cent of total pesticides produced in Canada in 1961, were: A.H. Howard Chemical Company, Limited, Allied Chemical Services Ltd., Chipman Chemicals Limited, Gallowhur Chemical Canada Limited, Manchester Products Limited, Niagara Brand Chemicals and Green Cross Products, a division of Sherwin-Williams Co. of Canada Ltd. Propas Chemicals Limited (Chemical Specialties Association Division) represented the small-scale operator and Naugatuck Chemicals Division of Dominion Rubber Limited, a producer of certain biologically active chemicals.

According to the joint submission of the seven companies there were 30 manufacturers of agricultural and industrial pesticides operating 41 formulating plants in 1962. Because of market considerations these plants were well dispersed and some of them were relatively small; they were located from Charlottetown, Prince Edward Island to Vancouver, British Columbia. The distribution of the plants by province was as follows: (1)

Pesticide Formulating Plants by Province, 1962

British Columbia	5	Ontario	18
Alberta	2	Quebec	7
Saskatchewan	3	New Brunswick	1
Manitoba	4	Prince Edward Island	1

None of the 30 formulators in Canada has facilities to manufacture all types of pesticides in powdered, liquid or granular form. However, fourteen formulators have the equipment to formulate a range of dusts, wettable powders or granular pesticides.

Proximity to the market is an important consideration for plant location in this industry. Not only is the demand for pesticides confined to short season, but it is also unpredictable with respect to weather, the arrival of pests and the intensity of pest attacks. Because of the unpredictability of the demand, adequate supplies of pesticides are required by the growers at short notice. Plant locations close to principal markets also facilitate the provision of technical services which are an essential feature of this industry. To provide technical service to users of pesticides, the seven companies making a joint submission on behalf of the industry were said to employ 51 agricultural graduates.

Because of the diversity of agricultural produce in Ontario, and the relatively high yield per acre from agriculture, a relatively great use of pesticides is made in Ontario and is reflected in the concentration of formulating plants in that province.

(1) Transcript, Vol. 108, p. 16324

"The number of plants is a reflection, primarily, on the nature of the Canadian geography and the effect of Canadian agriculture. They are related to the needs of agriculture in the various areas of Canada."⁽¹⁾

It was also claimed that:

"the economies of scale in this type of operation are not nearly so important as they are in some others ... it is probable that such economies of scale as could be achieved on centralization of production are less than the savings that accrue by having plants strategically located."⁽²⁾

The available data, as noted in the Market section which follows, indicate that, of final preparations, 40 per cent are agricultural herbicides, nearly 30 per cent are for crop and seed treatment and just under 20 per cent are packaged for household and industrial use. Rodenticides, livestock treatments and other miscellaneous types make up the remainder.

Domestic production of pesticide formulations in 1961 was said to supply about 60 per cent of the total demand of these products, and it was stated in the public hearing by a spokesman for the formulators that "probably every one of the 30 formulators in Canada has got excess capacity. It is certainly a general rule that there is considerable excess capacity." This statement was amplified further:

"There would be less excess capacity in the peak season but very few people in the peak season are running three shifts a day. It is almost unheard of in the industry and there are a number of plants that are virtually idle during the idle season."⁽³⁾

At another stage in the public hearing a spokesman confirmed that, so far as capacity to produce was a criterion, the remaining 40 per cent of demand could be met by the existing installed capacity. This production by Canadian companies, of course, incorporates a substantial quantity of imported materials.

The pesticides industry is characterized in general by relatively low overhead costs, ease of entry of firms, with low capital investment, a high degree of competition and large inventories.

In regard to profits it was stated in the producers' brief that:

"A confidential survey of the operations of those Canadian formulators which were willing to participate in it shows that the net profits of this group of eight companies for 1961 were \$356,000 or 2.26% of \$15,761,000 of sales. This is believed to be a low percentage of profits for an industry in which the turn-over is largely on a one-season basis."⁽⁴⁾

(1) Transcript, Vol. 109, p. 16482

(2) Same, Vol. 109, p. 16483

(3) Same, Vol. 108, p. 16409

(4) Same, Vol. 108, p. 16327

On another survey of the profits of the industry, carried out by the Canadian Agricultural Chemicals Association among its members, who were said to account for 50 per cent of the total sales, the following comment was made:

"In 1958 this survey indicated the ... firms reporting, 3.38¢ on the sales dollar. In 1959 it was 2.85¢ on the sales dollar and in 1961 it was 1.10¢ on the sales dollar. The firms reporting are different than those we were previously discussing, in the sense there are some included and, of course, there were the other firms. We don't know whether the same firms reported in our brief actually replied to the C.A.C.A. survey, but there were more firms in the C.A.C.A. survey than there are supporting our brief."(1)

In industries in which purchased materials account for a large part of the sales dollar, it is not unusual to find a low rate of profit to sales. The data are not available to permit the rates to be expressed on the basis of capital investment.

Concerning the role of patents in the pesticides industry, a spokesman stated:

"the formulating industry has few if any patents of their own. The materials we use are patented but we have no control over the patent situation as such...the patent applies to the biologically active chemicals in the main, not to formulations."(2)

The formulators who operate on a small scale and who frequently import materials and package the product for sale expressed concern over the severe competition which they faced from the larger producers.

The Canadian Market

With the developments in research, the additional knowledge of the behaviour and biological characteristics of pests and insects, and the continuous influx of new products to control and destroy them, the pesticides market in Canada has shown a remarkable increase during the last two decades. (See Appendix I, Sales of Pesticides, Selected Years, 1947 to 1964.) Even since 1955 the market has nearly doubled, reaching \$36 million in 1964, compared with \$19 million in 1955.

While the average rate of growth of pesticides sales in the last ten years was about nine per cent per year, the annual growth was not uniform, but varied with conditions in each year, for example a severe outbreak of grasshoppers on the prairies in 1961. The sales for the past few years suggest that, barring some severe outbreak of pests, a moderate rate of growth for pesticides has now become established.

(1) Transcript, Vol. 108, p. 16392

(2) Same, Vol. 109, p. 16494

Sales of Pesticides by Firms Registered under the
Pest Control Products Act, Selected Years, 1955-64

<u>Year Ending September 30</u>	<u>Sales \$</u>
1955 ^(a)	19,146,000
1958	20,102,000
1960	26,548,000
1961	33,100,000
1962	34,376,000
1963	35,707,000
1964	35,920,000

(a) Calendar Year

Note: Livestock wormers not included, and the Pest Control Products Act does not include slimicides used in the pulp and paper industry, nor anti-rope products used in baking.

Source: D.B.S., Sales of Pest Control Products by Canadian Registrants, Cat. No. 46-212

Market by Type of Use

Agriculture is by far the largest user of pesticides. In 1964, agriculture (crop and seed treatment, livestock treatment and herbicides) made up 75 per cent of total use of pesticides in Canada; household and industrial use accounted for the remainder. Not only is agriculture the largest user of pesticides, but this use also increased more rapidly than the other principal uses during the past six years, although the percentage rate of increase in some minor uses was even more rapid.

Details of the sales of pesticides by type from 1959 to 1964 are given in the table on the following page.

It is evident from the table that, within the agricultural sector, herbicides witnessed the most substantial increase in the period 1959 to 1964, and accounted for more than 60 per cent of the total growth in all pesticide use. Herbicides came to occupy 40 per cent of the total in 1964 compared with just over 30 per cent in 1959. Of this phenomenal growth in the use of herbicides, a spokesman for the formulators stated at the public hearing:

"One of the most dramatic areas where growth has existed is in the herbicides field. Research has now developed materials which are extremely specific. Wild oats and grain is simply taking a grass out of grass. It is an extremely important advance. In other crops we are now taking weeds out of crops without harming the crops, which could never be done before, and all these things of course added to our sales value."⁽¹⁾

(1) Transcript, Vol. 108, p. 16346

Sales of Pesticides in Canada by Type, (a) Crop Years Ending September 30, 1959-64

<u>Types of Pesticides</u>	<u>1959</u> \$'000	<u>1960</u> \$'000	<u>1961</u> \$'000	<u>1962</u> \$'000	<u>1963</u> \$'000	<u>1964</u> \$'000	<u>Per Cent</u> <u>Increase</u> <u>from 1959</u> <u>%</u>
(A) Agriculture							
(i) Crop and Seed							
Treatments							
(ii) Livestock	9,630	9,872	12,329	13,117	13,470	10,285	6.8
Treatments							
excluding							
wormers (b)	1,224	1,404	1,818	1,955	1,794	1,770	44.6
(iii) Herbicides	7,608	8,396	10,295	11,333	12,736	14,561	91.4
Total (A)	<u>18,462</u>	<u>19,672</u>	<u>24,442</u>	<u>26,405</u>	<u>28,000</u>	<u>26,616</u>	<u>44.2</u>
(B) Household and Industrial Insecticides	5,405	5,785	7,426	6,784	6,295	6,697	23.9
(C) Rodenticides	447	511	561	482	557	579	29.5
(D) Other	<u>485</u>	<u>580</u>	<u>671</u>	<u>705</u>	<u>855</u>	<u>2,028</u>	<u>318.1</u>
Total (B), (C) & (D)	<u>6,337</u>	<u>6,876</u>	<u>8,658</u>	<u>7,971</u>	<u>7,707</u>	<u>9,304</u>	<u>46.8</u>
Grand Total	24,799	26,548	33,100	34,376	35,707	35,920	44.8

(a) Sales of pesticides by Canadian registrants under the Pest Control Act; certain classes of disinfectants such as chlorine and pine oil are not normally handled by the Pesticides Industry, and such disinfectants were discontinued in the D.B.S. Sales data in 1950

(b) Livestock wormers - These are regarded as pharmaceutical products not normally sold by the pesticides industry

Source: D.B.S., Sales of Pest Control Products by Canadian Registrants, Cat. No. 46-212

The data of the above tabulation indicate a proportionately larger use in the household market when expressed in value terms than when expressed in quantity terms because of the greater packaging cost in the household products.

Another tabulation, based only on the pesticides produced by the formulating companies, does not include the large quantities packaged by major retail outlets or by agricultural cooperatives. Much of this packaging may be of imported products not included in the production of the formulators. The tabulation which follows provides some information on the trend of sales within that part of the market, just over half of the total, supplied by the formulating industry.

Factory shipments of the main groups of pesticides from the Canadian plants were as follows:

Factory Shipments by Pesticide Manufacturers, 1956-62

	<u>1956</u>	<u>1957</u>	<u>1958</u>	<u>1959</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>
	- thousand dollars -						
Agricultural dust and sprays	3,685	4,090	4,245	3,970	3,945	5,648	2,565
Herbicides	2,092	2,897	2,443	3,598	3,572	4,252	6,018
Household and industrial in- secticides	885	775	730	795	1,974	2,961	4,069
Rodenticides	212	199	247	339	83	88	120
Disinfectants	1,201	1,275	1,325	1,357	1,387	1,218	1,844

Source: D.B.S., Cat. No. 46-216

In the pesticide trade, packaging is of special significance in respect of the particular market being served and the method of the application of the product. In part it results from the necessity to provide careful instructions for use and precautions against hazards. It, therefore, becomes one feature of the competitive service. For household use, attractive containers designed for easy application of the product and bearing all necessary instructions and precautions substantially increase the sales value of the relatively small volume of products sold for household use. In volume terms, most sales are in the large quantities required for agricultural and industrial uses. It was noted at the public hearing that:

"Official statistics are not available for the volume of small package consumption, but we estimated this market to be between \$5,000,000 and \$6,000,000. The products are designed for use by home owners on flowers, ornamental shrubs, trees and vegetables for home use. They include also insecticides for use inside the house."

and that:

"The reason for the emphasis placed on the large packages is that they represent the most important part of the pesticides market and they are now without any tariff protection."⁽¹⁾

Various estimates of the economic significance of the use of pesticides in agriculture are available from different sources. The National Farmers Union quoted the figure of \$54 million as the estimated gain to the agricultural industry through the use of specific pesticides in a year. Another estimate placed the overall damage done by insects as a whole as about \$300 million annually, excluding the cost of control measures.⁽²⁾ A very much greater value to agriculture was assigned to pesticides by another source.

"According to D.K. Jackson of Monsanto Chemical, total savings to Canadian Agriculture in 1962, due to the use of pesticides, was \$925 million and there are still being lost \$1,500 million which could be saved if present known pesticides, or those in the near-commercial stage of development were used to stop the losses."⁽³⁾

Whatever the reliability and accuracy of these estimates, they do reflect the important economic role assigned to pesticides in agriculture and in other fields. In this connection, it was stated in the formulator's submission that "very few crops can now be grown economically without the protection which pesticides provide."⁽⁴⁾

As pests have a tendency to build up immunity, there is a regular influx of new pesticide products with more potency and less side effects. On this aspect the National Farmers Union representative stated:

"New pests ... for which new pesticides must be continually developed, and this includes the fungi that attack the seed, as well as the various pests in the soil, worms and insects, and weeds of the various kinds. This also refers to ... new developments in pesticides or new techniques for using existing pesticides, that will attack those that haven't been able to be controlled before, and it is a continual development ... of techniques that will be precise enough for the particular pest to deal with it effectively."⁽⁵⁾

Moreover, as was noted, as long as the cost of the newer chemicals and their application are well returned in increased quality of agricultural products and yield, there is always a potential increase in demand for pesticides, especially insecticides and fungicides formulations.

The increasing use of land under some types of agriculture, the increasing awareness on the part of users and the availability of

(1) Transcript, Vol. 108, p. 16330

(2) Same, Vol. 107, p. 16225

(3) Mr. R.B. Marr, 12th Annual Meeting and Conference, Canadian Agricultural Chemicals Association, September 13 - 16, 1964, Ottawa

(4) Transcript, Vol. 108, p. 16319

(5) Same, Vol. 107, p. 16242-3

technical facilities have all stimulated the sale of pesticides. The spokesman of the National Farmers Union stated in the public hearing that:

"the volume of pesticides sold is not a function wholly of acreage sown or crop prospects. There is a marked trend toward greater use regardless of these circumstances."(1)

In addition, the spokesman for the National Farmers Union expressed the farmers' concern over rates of duty in terms of the relative importance of the costs of pesticides in farm operations.

According to the submission by the National Farmers Union it costs \$18 to \$19 to produce 15 to 20 bushels of wheat from one acre of land and the cost of the pesticides is about one dollar or two dollars. The average return per acre was said to be small, and the National Farmers Union was concerned that any increase in the duty on pesticides would narrow the margin of profit for wheat farmers and reduce their total income.(2)

Two surveys of the cost of pesticides to farmers are of interest in this context. One farm survey for the year 1958 conducted by the Dominion Bureau of Statistics showed a lower percentage cost than the 5 to 10 per cent indicated by the Farmers Union. The D.B.S. survey, however, was not confined to wheat farms and it likely is expressed as a ratio of a broader spectrum of expenditures than was used by the National Farmers Union.(3) The D.B.S. survey, moreover, was for an earlier year, when the use of pesticides was smaller than in more recent years.

Pesticides Expenditures as a Percentage
of Total Expenditures on Individual
Farms in 1958

<u>Area</u>	<u>Pesticides(a) Percentage</u>
Canada	0.7
Prince Edward Island	2.1
Nova Scotia	0.6
New Brunswick	1.1
Maritime Provinces	1.1
Quebec	0.4
Ontario	0.5
Manitoba	0.8
Saskatchewan	1.2
Alberta	0.8
Prairie Provinces	0.9
British Columbia	1.3

(a) Weedicides, insecticides, spray and dip disinfectants for livestock, fungicides and rodent poison

Source: D.B.S., 1958 Farm Survey, Cat. No. 21-506

(1) Transcript, Vol. 107, p.16239

(2) Same, Vol. 107, p. 16250-2

(3) Dominion Bureau of Statistics, 1958 Farm Survey Report No. 1 (Expenditures, Receipts, and Farm Capital) November, 1962, Cat. No. 21-506, Table 6, p. 26

The other survey was conducted by the Manitoba Department of Agriculture and Conservation on pesticides used in Western Canada for weed control on field crop acreage treated in 1964.

Average Rates of Application,
Ounces of Acid Per Acre, 1964 Crop

<u>Formulation</u>	<u>Manitoba</u>	<u>Saskatchewan</u>	<u>Alberta</u>	<u>British Columbia</u>
2,4-D Esters	6.0	5.6	5.7	5.0
2,4-D Amine	7.4	5.9	6.5	8.0
MCPA Ester	6.0	5.7	6.6	5.0
MCPA Amine	6.5	6.0	7.2	8.0
MCPA Sodium salt	6.6	6.6	8.3	9.0
Total	32.5	29.8	34.3	35.0

Source: L.R. Rigaux & H.A. Craig, Herbicides Used Agriculturally in Western Canada for Weed Control, Economics and Publications Branch, Manitoba Department of Agriculture & Conservation, November 26, 1964

The consumption of pesticides, on an acid basis, for weed control in the four Western provinces in 1964 as a simple average, came to 32.9 ounces per acre, or a little more than 2 pounds per acre. At an average price of possibly one dollar per pound⁽¹⁾ of the acids used, the consumption of pesticides approximates two dollars per acre, which corresponds with the figure quoted by the National Farmers Union.

Market by Region

While data on the provincial or regional distribution of the pesticide market are not readily available, it is apparent, as was noted at the public hearing, that there are significant regional differences in the use of pesticides and in the extent to which farmers in different regions have accepted the use of pesticides. The use of herbicides is more prevalent on the Prairies for the treatment of cereal crops, while insecticides are more widely used in Ontario, partly because of fruit-growing. Both British Columbia and the Atlantic Provinces have important fruit crops, and also significant uses in forestry. Farming in Quebec and in some of the other provinces is somewhat less specialized, and the agricultural use of pesticides is relatively less than in areas where particular products are applied to specific crops. As noted earlier, approximately 60 per cent of the formulating plants are located in Ontario and Quebec. The regional pattern of imports, as set out in a later table, also show a greater concentration in these two provinces.

Market by Source of Supply

As stated earlier, about 60 per cent of the Canadian market in 1961 was met by formulations made in Canada and the rest was served by imports. Data on imports of finished pesticides from all countries are not available, but most of the imports of these products are from the United States.

⁽¹⁾ Estimated on the basis of quantity, value data given in the D.B.S. Report on Sales of Pest Control Products by Canadian Registrants

Some of the pesticide manufacturers placed the domestically produced share of the market somewhat higher than the above estimate indicates. Of a total market of \$33 million in 1961, these producers estimated that about \$23 million, or nearly 70 per cent, was from domestic production and \$10 million from imports.

"no official statistics are available to show the value of imports ... since D.B.S. import statistics for pesticides do not differentiate between active ingredients and formulations. A very rough estimate, however, based partly on up-to-date information available in the trade, and partly on a breakdown by the D.B.S. of Customs figures for 1958, suggest a value of the order of \$10,000,000 for total imports of finished pesticides in the year ended September 30, 1961."⁽¹⁾

A survey by the Tariff Board indicated that imports entered as materials and those entered as preparations were almost equally represented in the import data, suggesting a somewhat smaller amount of finished formulations than that noted in the quotation above.

The trend seems to be towards increasing participation of the domestic producers in the Canadian market. To attempt to increase their service to the Canadian market, since the companies engaged in the production of pesticides do not produce the full range of products, there is interchange of products between the companies. As a spokesman noted, "formulators in Canada do sell finished formulations to each other at prices mutually attractive and that any increase in this type of business would be welcomed."⁽²⁾

Even so, the market, for pesticides was said to be very competitive.

Foreign Trade

As was pointed out above, imports of complete pesticide preparations are not tabulated separately. Imports of preparations, concentrates and biologically active materials, in total, were reported, in the D.B.S. trade statistics to be nearly \$20 million in 1963. Most imports are from the U.S.A., and imports of preparations from that country in 1963 as reported in the U.S. export statistics were about \$12.5 million. These, however, also likely include some concentrates that are basic materials for Canadian manufacturers rather than finished preparations. The products include various types of DDT formulations, herbicides, insecticides, fungicides and disinfectants, details of which are given in Appendix I. The totals from the U.S. data are reproduced here from 1958 to 1964, along with some indication of the share of the Canadian market apparently met by these imports in each year. It is probable, however, that a large part of these importations was by companies packaging them for sale in Canada possibly, in many instances, after some further blending or dilution; the actual competitive effect, therefore, is difficult to assess.

(1) Transcript, Vol. 108, p. 16324

(2) Same, Vol. 109, p. 16511

U.S. Exports of Pesticide Preparations to Canada, 1958-64

<u>Year</u>	<u>Value</u>	Approximate
	U.S. \$'000	Share of Canadian Market (a) Per cent
1958	8,222	41
1959	10,341	42
1960	12,095	46
1961	13,899	42
1962	12,993	38
1963	12,493	35
1964	11,955	33

(a) Imports (calendar year) as a per cent of sales by registered firms
(on a crop year basis)

Source: U.S. Exports, FT40

The portion of the Canadian market met by imports appears to have declined from the 1960 peak, as imports have remained fairly steady and Canadian production has increased. As noted, it is difficult to assess the competitive effect of imports. Many of the importations are by companies within the industry which are, to various degrees, formulators, packagers and distributors. While many of the imports likely are directly competitive with formulations made in Canada, some will be new formulations for similar uses and some will be for uses not entirely served by Canadian production. Moreover, those that are directly competitive will, in some instances, be competing against other imported preparations or against formulations made from imported materials.

A spokesman for a group of the formulators noted that:

"there are certain formulations which the Canadian formulators can't make ... To some extent it is technical facilities. More often it is a patent on products or perhaps they are more economically made where the main bulk of materials are. A lot of these could be made in Canada and would be made in Canada if there was a duty on them."⁽¹⁾

It was mentioned in the public hearing that imports of pesticides in small packages (less than 3 lb.) were not substantial; these are imported under tariff item 219a(1) and dutiable at Free, B.P., 12½ p.c., M.F.N.; the value of these imports ranged from \$500,000 to \$600,000 a year.

The main groups of pesticides imported from the U.S.A. were as follows:

⁽¹⁾ Transcript, Vol. 108, p. 16373

U.S. Exports of Pesticides to Canada, by Main Groups, 1958-64

	<u>1958</u>	<u>1959</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>
	\$ '000						
Agricultural Insecticides and Formu- lations	608	752	865	1,294	1,557	1,515	1,310
Herbicides	2,515	2,298	3,977	4,877	3,505	3,152	3,038
Household and Industrial Insecticides and Pesticides	930	1,234	1,144	1,028	916	760	1,175
DDT Formulations and Insecticides various grades	1,581	2,590	1,931	2,560	2,205	1,495	1,174
Fungicides	1,486	2,142	2,561	2,602	3,130	3,921	3,215
Disinfectants	1,037	1,260	1,534	1,438	1,500	1,548	1,893

Source: U.S. Exports, FT40

Imports of herbicides and fungicides accounted for more than half of the total imports in 1964. DDT formulations and disinfectants comprised more than twenty-five per cent and household and industrial insecticides nearly ten per cent. This pattern more or less prevailed in other years as well. With the exception of disinfectants, the portion of the Canadian demand served by the imported groups of pesticides has, in general, declined over these years.

Imports by Region

The D.B.S. import statistics of pesticides by region include not only preparations but also chemicals and materials used in the manufacture of pesticides. However, these data give an indication of the flow of imported pesticides and materials to different regions and the extent of the regional market served by them. Because of the relatively wider range of pesticides used in Ontario and the existence of large formulating facilities in that province, many of which use imported products, a major portion of the imported pesticides and pesticidal materials goes to Ontario. However, the extensive application of herbicides on the prairies results in significant importations of weed-killing preparations and chemical materials into those provinces; imports of pesticides to the Prairies, moreover, are likely to increase substantially from time to time in periods of serious insect outbreaks.

In 1963, Ontario accounted for just under 50 per cent of the total imports of pesticides and materials, the Prairie Provinces 25 per cent and Quebec close to 20 per cent. Details of imports of pesticides and materials for 1963 are given on the following page.

Regional Distribution of Imports of Pesticides
and Pesticide Materials, 1963

<u>Region</u>	<u>Preparations or Chemicals, Weed Killers s.c. 8069</u>	<u>Preparations or Chemicals, Insecticides in Packages, not exceeding 3 lb. s.c. 8072</u>	<u>Pesticides and Materials in Bulk s.c. 8073</u>	<u>Regional Total</u>
Maritimes				
\$'000	33.6	19.0	526.6	579.2
% of total	0.6	3.7	4.0	2.9
Quebec				
\$'000	560.5	146.6	3,038.6	3,745.8
% of total	9.2	28.9	23.0	18.9
Ontario				
\$'000	2,740.3	242.1	6,232.1	9,214.5
% of total	45.1	47.8	47.3	46.6
Prairies				
\$'000	2,395.1	39.2	2,482.0	4,916.3
% of total	39.4	7.7	18.8	24.9
British Columbia				
\$'000	344.0	60.0	909.5	1,313.4
% of total	5.7	11.8	6.9	6.6
<hr/>				
Canada Total				
\$'000	6,073.5	506.9	13,188.8	19,769.2
%	100	100	100	100

Source: D.B.S., Imports

At the time of the hearing, in 1962, by far the largest part of the biologically active chemicals used in Canada for formulating pesticide preparations was imported. The major exceptions consist of 2,4-D, 2,4-5T acid and esters and M.C.P. esters used in herbicides; certain other ingredients for fungicides, seed treatment, moth preventatives and rodenticides are also made in Canada. In total, however, possibly 75 to 80 per cent of the biologically active ingredients are imported. Of these, 85 to 90 per cent were said to come from the U.S.A., with the balance coming principally from Britain and West Germany.

Data on exports are not readily available for products specifically under consideration in this part of the report. For the five years 1956-60 exports of dipping, spraying and insecticide compounds had an average value of more than \$185,000, and re-exports averaged just under \$50,000. Beginning in 1961, the export data have been

published as "agricultural chemicals, formulated insecticides and rodenticides". While it is probable that exports under this classification are chiefly pesticide products, there is no exact knowledge on this matter. Exports of this group of agricultural chemicals exceeded one million dollars in 1961 and 1963, but declined to \$347,000 in 1964. Re-exports, however, in 1964 were an additional \$412,000. The exports and re-exports are shipped to many countries, principally in the Caribbean and South America. In most years only a small part of the exports and re-exports is shipped to the U.S.A. (Table showing exports and re-exports is given in Appendix I.)

With respect to export opportunities in the U.S.A., one spokesman said:

"The tariff excludes the materials made in Canada from the U.S. market. Primarily because the basic costs for Canadian formulators is the same as costs of U.S. formulators, to get them into the market we have this 30 to 50% ... to overcome which is prohibitive."⁽¹⁾

Exports to countries other than the United States are limited because the Canadian industry does not manufacture, in large amount or variety, the basic ingredients, and in many cases has to compete with the manufacturer of the basic materials who is also a formulator. Patents and freight costs were also said to hinder exports.

Pricing Policy and Prices

In an industry as fragmented as pesticides, with a very large number of firms, competition is keen and, because of low overhead costs, entry of new firms is easy. The combination of a number of large-scale formulators and many smaller, scattered plants results in competition arising from the comparative advantage of the one type against the other in local market areas. It was stated at the public hearing that:

"It wouldn't be very long before any price level will be subject to pressures and will collapse ... you start the season with a price list and you hope it will be the price you will actually recover from your product. It happens in this particular season /1961/ it didn't turn out to be the fact ..."⁽²⁾

As regards competition from imports, although some imported formulations are of a kind not made in Canada, even they, it was suggested, offer competition to the products made in Canada. Costs of production are heavily weighted by costs of raw materials, many of which are themselves imported; the formulators in Canada are not for the most part highly integrated as suppliers of their own materials. Packaging costs are an important element of costs in many household preparations.

⁽¹⁾ Transcript, Vol. 108, p. 16394-5

⁽²⁾ Same, Vol. 108, p. 16364

The large inventories of pesticides required to meet the short, heavy seasonal demands and unforeseen needs for particular preparations also have a bearing on the cost and price of finished products.

It was also stated by the companies that the research and development costs involved in the production of new chemicals and preparations tend to keep the initial price high.

"The cost of developing a new pesticide, up to the stage of registration under the Pest Control Products Act, has been estimated at \$3/4 million to 3 million. Only one out of approximately every 3600 new chemical compounds completes the journey, the remainder being discarded because they are unsuitable for pesticide use for various reasons, but the cost of all the screening, testing, analysing and development adds up to this large amount of \$3/4 to \$3 million. Actually most research is done outside Canada because the value of sales of Canadian companies is not large enough to support research at this level."(1)

The average selling value per pound of some of the popular pesticides used in agriculture, industry and households for the last five years are given on the following page. Of the 26 different pesticide products listed in the table, fourteen were at a lower average value in 1964 than in 1960, ten showed an increase, some very slight, and the average values of two products were the same in the two years.

Taken together, on a simple average basis, these prices showed a decline from about 89 cents per pound in 1960 to approximately 80 cents a pound in 1964. Though it is not known what an appropriately weighted price index would show, it is possible that the increasing use of new products, with relative stability at a higher level of prices, has offset the declining trend in prices of the old established products, making for greater overall price stability at a higher level than the simple average indicates.

Canadian prices of pesticides were reported to be generally the same as or lower than the comparable U.S. prices. At one stage in the public hearing it was stated by a spokesman for a group of formulators, in commenting on the comparison:

"by and large prices are ... a little lower in Canada than in the United States, but there are difficulties in making direct comparisons. The formulations are not exactly the same. The packaging is not necessarily exactly the same, and that sort of thing."(2)

(1) Canadian Agricultural Chemical Association, Report of the 12th Annual meeting, page 3

(2) Transcript, Vol. 108, p. 16364

Average Selling Value of Certain Popular Pesticides
Used in Canada, 1960-64

<u>Pesticides by Type</u>	<u>1960</u>	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>
		dollars per pound			
<u>Agricultural Dusts & Sprays</u>					
Arsenic dusts (without copper)	0.04	0.05	0.05	0.05	0.05
Aldrin - Dusts	1.43	1.25	1.32	1.28	0.73
Aldrin - Emulsions	1.52	1.00	0.99	1.47	1.55
Aldrin - Wettable powders	1.41	1.48	2.50	2.95	3.26
DDT - Dusts	1.68	0.81	0.92	0.32	0.45
DDT - Emulsions	1.22	0.79	0.73	0.60	0.55
DDT - Wettable powders	0.48	0.42	0.44	0.42	0.44
<u>Herbicides</u>					
MCPA - Amine (acid)	1.27	1.16	1.11	1.07	1.04
MCPA - Ester (acid)	1.42	1.96	1.23	1.00	1.02
Triazines (product)	-	1.83	1.46	1.51	1.28
2,4-D Formulations					
2,4-D Amine liquid (acid)	0.88	0.79	0.74	0.66	0.66
2,4-D Ester dust (acid)	1.48	1.42	1.22	1.59	1.56
2,4-D Ester liquid (acid)	0.77	0.75	0.65	0.66	0.78
2,4,5-T Formulations, Ester	1.37	1.68	1.52	1.83	1.26
<u>Household & Industrial Insecticides</u>					
Paradichlorobenzene (Fumigant)	0.40	0.29	0.37	0.35	0.33
Ant traps, powders & dusts	0.15	0.13	0.14	0.15	0.15
DDT insect powders	0.44	0.52	0.46	0.37	0.50
Fly baits	0.48	0.56	0.53	0.53	0.52
Insecticide powders (without DDT)	0.12	0.19	0.14	0.15	0.17
Mill and Warehouse sprays (pyrethrium type)	0.51	0.53	0.57	0.58	0.30
Self-propellent insecticides for fabric protection (No.)	0.86	0.80	0.89	0.89	0.82
Self-propellent insecticides for spray on foliage (No.)	0.84	0.87	0.86	0.93	0.91
Self-propellent air sprays, chlorinated hydrocarbon type (e.g. DDT, Methoxychlor, etc.)	0.81	-	1.34	1.07	0.81
Pressurized - mosquito and fly repellents (Dimethyl phthalate, indalone, ethyl) (No.)	0.73	0.75	0.73	0.79	0.71
<u>Rodenticides</u>					
Warfarin and pival type					
mouse and rat poisons -0.5%	1.43	0.46	0.82	0.77	0.80
-0.025%	0.45	0.50	0.49	0.41	0.46

Source: Calculated from the sales data in D.B.S., Sales of Pest Control Products by Canadian Registrants

One of the reasons suggested for this difference was that the duty-free entry into Canada of both formulations and active ingredients assisted a producer in Canada to offer a more complete line of products than otherwise would be possible, and perhaps was of special benefit to the small scale formulator, packager or distributor.

Chemical Specialties Association, Division of Propas Chemicals Ltd., making a submission as a smaller formulator in Canada, stated:

"The price competition in the sales field, is not a result of finished formulations entering Canada in the wettable powder or granular form, causing a lower price for the Canadian products. The prices of the Canadian products are set by the Canadian manufacturers with facilities to formulate these pesticides. The major formulator, with complete equipment, finds it unattractive to sell to the smaller formulator at the prices that the U.S. custom packager or formulator will provide. This however, does not determine that the U.S. custom formulators are dumping to the Canadian market, but in effect, the small formulator can compete with the larger formulator by having the U.S. facilities."(1)

As is noted in the following section, the importation of the basic ingredients, followed by formulation in Canada, also is favoured somewhat by transportation considerations.

Published Grower Prices of Selected Pesticide Formulations,
New York and Ontario, 1962

<u>Dusts & Wettable Powders</u>	<u>New York State</u>		<u>Ontario User</u>
	<u>\$U.S.</u>	<u>\$Cdn. (a)</u>	<u>Prices</u>
		50 lb. bag	<u>\$Cdn.</u>
Aldrin 5 Dust	7.75	8.14	7.45
DDT 5 Dust	4.00	4.20	3.90
Endrin 1 Dust	6.35	6.67	5.00
Fixed Copper Dust	6.80	7.14	5.20
Fixed Copper 7 DDT 3 Dust	7.45	7.82	5.95
Malathion 4 Dust	6.85	7.19	6.35
Rotenone 1 Dust	7.00	7.35	6.70
<hr/>			
<u>Liquids and Emulsions</u>	<u>Price per lb. of Active Ingredient</u>		
Aldrin 2 E.C.	2.13	2.24	1.90
DDT 25 E.C.	0.88	0.92	0.79
Endrin 2 E.C.	4.93	5.18	4.43
Malathion 5 E.C.	1.82	1.91	2.52

(a) U.S. price times 1.05

Source: Pesticide Manufacturers' letter to Tariff Board,
November 26, 1962

(1) Transcript, Vol. 109, p. 16499

From information made available to the Board on published prices of pesticide formulations in New York and Ontario in 1962, it is evident that the list prices of a majority of similar products were higher in New York than in Ontario; when expressed in Canadian funds, at the rate of exchange prevailing at the time, the prices of the U.S. products would be even higher. However, as noted by a spokesman for the pesticide manufacturers, these are list prices and not the prices realized by the manufacturer, either in Ontario or New York, through the growing season. Particularly as the season advances, prices at which sales are actually made frequently are well below list prices.

A more complete list of comparative prices appears in Appendix I. A similar comparison for Prairie locations in Canada and the U.S.A. was said to indicate that prices in Canada were about the same or slightly lower than in the U.S.A.

Some price information is also available in the Restrictive Trade Practices Commission's report, Distribution and Pricing of Pesticides, published recently. This information is, however, confined to some selective pesticides, produced by certain firms. The report also comments on distribution practices of certain firms in the industry, including selling and price agreements, trade marks and patents, and licensing arrangements.(1)

Transportation

The time factor in transporting pesticides from the production centre to the consumption centre is of special importance to the pesticides industry because of the seasonal nature of the market and the unpredictable demand arising from a sudden need. In view of this consideration, and the relative ease of establishment, formulating plants are located as close as is practical to the principal markets they supply. Storage of products in local market areas is generally not carried much beyond the obvious, normal requirements for stock on hand. In much of the market in Canada, the time factor can work to the advantage of the Canadian producer in supplying the domestic market, but it similarly assists producers in other countries where they are more favourably situated to serve other markets.

"For example, the time required for transporting finished pesticides to a consumer area in Ontario will vary from about two to five days from the U.S. plants near the border to more than ten days from the southern states, and over a month from European plants."(2)

The need to furnish technical services to the growers also favours the location of plants close to markets. To be effective, this service must be available to the user as quickly as possible.

(1) Department of Justice, Restrictive Trade Practices Commission, Distribution and Pricing of Pesticides; Ottawa, 1965

(2) Transcript, Vol. 108, p. 16322-3

Freight costs in the movement of pesticides within the country are not considered to be a particularly significant factor.

"These [pesticides] are relatively high priced materials. It is possible to ship them considerably longer distances than in the case of fertilizers or common sod or things of that sort. We are talking here about ... 2, 4-D, \$2 or \$4 a gallon as opposed to three or four cents a pound on fertilizers. While freight is important ... it seems to me it is not nearly so important indeed as it would be in some of the other chemicals with which the Board has been concerned."⁽¹⁾

For some active ingredients, a range in the delivered prices was cited as from 21 cents per pound for DDT to about \$2.70 per pound for endrin in carload quantities in the Hamilton-Niagara area, with freight costs on these products of only one-half cent to two and one-quarter cents per pound.

Freight costs were considered to be a factor favouring the importation of the basic ingredients rather than formulations, as illustrated by a remark by the spokesman of the National Farmers Union, "Many of the pesticides used in Canada are imported, and formulated in this country because freight differentials offer the industry useful competitive advantages."⁽²⁾

Freight costs were considered to be a hindrance to the export of pesticides, particularly the cost of getting the products to ocean ports in the Canadian winter months when the southern hemisphere requires the products.

Tariff Considerations

Existing Tariff Items

The pesticides and materials for pesticides of this Reference enter Canada chiefly under the following tariff and drawback items:

<u>Tariff Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
208c Dehydrated sulphate of copper for agricultural or spraying purposes	Free	Free
209b Nicotine; salts of nicotine; non-alcoholic preparations containing nicotine in a free or combined state, for dipping, spraying or fumigating, n.o.p.	Free	Free
210i Sodium hypochlorite in solution	15 p.c.	20 p.c.

⁽¹⁾ Transcript, Vol. 108, p. 16402

⁽²⁾ Same, Vol. 107, p. 16247

<u>Tariff Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
219a	Non-alcoholic chemicals for disinfecting, or for preventing, destroying, repelling or mitigating fungi, weeds, insects, rodents, or other plant or animal pests, n.o.p.; non-alcoholic preparations compounded exclusively for disinfecting or for preventing, destroying, repelling or mitigating fungi, weeds, insects, rodents, or other plant or animal pests, n.o.p.:-	
	(1) When in packages not exceeding three pounds each, gross weight.	Free 12½ p.c.
	(2) Otherwise	Free Free
219e	Chloropicrin, ethylene oxide, methyl bromide, methyl formate, cyanides, carbon bisulphide, acrylonitrile, or mixtures containing any of these, for use in combatting destructive insects and pests.....	
	Free	Free
250	Paris green, dry	Free 7½ p.c.
791	Materials of all kinds for use in producing or manufacturing preparations provided for in tariff items 209b and 219a under such regulations as the Minister may prescribe.....	
	Free	Free

Drawback ItemDrawback of duty

1026	Materials. (2/5/30, 310-B) When used in the manufacture of containers for articles entitled to entry under tariff item 219a....	99 p.c.
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Some mixtures of chemicals used in pesticide preparations and which contain alcohol would be dutiable under item 220a(ii) at a rate of 25 p.c., B.P. and M.F.N., but subject to additional duty if containing more than forty per cent of proof spirit.

The Classification of Products

The Industry Committee and the manufacturers proposed that the goods be classified according to B.T.N. heading 38.11, as follows:

"Disinfectants, insecticides, fungicides, weed-killers, anti-sprouting products, rat poisons and similar products, put up in forms or packings for sale by retail or as preparations or as articles (for example, sulphur-treated bands, wicks and candles, fly-papers)"

The products of the heading should be in the following forms, as outlined by the Industry Committee:

"(1) In packings for sale by retail or in forms recognizable as normally sold by retail, e.g. tablets, balls and strings of balls. Products put up in these ways may be mixtures or single chemically defined substances, e.g. paradichlorobenzene which in another form would be classified by 29.02.

"(2) Preparations in bulk and having a composition which indicates them to be more suitable for use in combatting or destroying pests or in preventing sprouting, than for other purposes.

"(3) Articles such as sulphur bands, wicks and candles, fly-papers (of the poison or adhesive type), fruit tree grease bands (whether or not poisonous), and papers impregnated with food preservatives.

"Heading 38.11 does not apply to -

(a) Products not described by (1), (2) or (3) above. According to their nature, these products would be classified by other headings, e.g., naphthalene 29.01.

(b) Preparations covered by more specific headings or in which pesticidal properties are subsidiary, e.g., anti-fouling marine paints (32.09); medicaments (BTN 30.03).

(c) Deodorants which are not pesticides. Such deodorants are likely to be classified as perfumery or toilet preparations (BTN 33.06), miscellaneous preparations (38.19) or chemicals of Chapter 29."(1)

It was recognized at the hearing that problems of administration exist in applying this classification, though it was considered that the requirement of a designated form of packaging, or the basic characteristic and function of the preparation would enable the classification to be straightforward in most instances. Some individual situations might arise in which the scope of an item worded like heading 38.11 might extend beyond the coverage of the tariff items which are formally part of Reference 120, but such extensions of scope are not likely to be of great commercial importance. The registration of products under the Pest Control Products Act might serve as some guide to the scope of such an item in cases where suitability of use was open to question.

The scope of heading 38.11 was also discussed with respect to other products that might be included or excluded. Some of the products discussed were: defollients, fruit crop thinners and anti-sprouting preparations, slinicides, lampricides, sodium hypochlorite, Dogzoff (trade name), and soil drench.

With regard to defollients used for killing the tops of potato plants in order to simplify the harvest procedure, or used in other countries for thinning leaves of cotton plants, a spokesman for the Industry Committee stated:

"There is no specific mention of defollients in either the Nomenclature or the Notes, but having studied both ... I consider that they would be classified by Heading 38.11 ..."(1)

He further amplified this statement by saying:

"The defollients ... are preparations which cause plants to lose their foliage, and this, in turn, would cause them to die. The Notes for Heading 38.11 state that the preparations that are described by this Heading are for destroying or combating a number of substances, among which are weeds, that is plants, and it is on this basis that defollients would interfere with the continued growth of the plant that I suggest they are classified as similar products to those that are mentioned in the Heading."(2)

The question of formulations for thinning out fruit crops and anti-sprouting agents received considerable discussion at the hearing. A point of view which was expressed and not challenged was:

"Obviously when you are setting up a Tariff, everything that is within the terms of reference is up for classification. Heading 38.11 is not confined to pesticides. Anti-sprouting agents are not pesticides in the ordinary way, and we suggest that these defollients and fruit thinners, and things to delay the drop of fruit, and so on, all be in Heading 38.11, and that the Item be so worded as to make it clear that they are."(3)

Fruit formulations are of two types: one to thin the fruit and the other to prevent premature drop at harvest time. Examples of these products are: 2,4,5,P, propinyl acid $\overline{\text{2-(2,4,5,-Trichlorophenoxy)}}$ (propionic acid) and naphthalene acetic acid.

Slimicides are used, for example, in the pulp and paper industry as insecticides to inhibit slime and would be classified by heading 38.11 of the B.T.N.

The Canadian Federation of Agriculture suggested that lampricides used for killing the lampreys in the Great Lakes are pesticides of heading 38.11.

(1) Transcript, Vol. 110, p. 16581

(2) Same, Vol. 110, p. 16582

(3) Same, Vol. 110, p. 16583

The defolients and other products mentioned above may be imported, in large quantities, duty-free under tariff item 219a(2) and, when in packages not exceeding three pounds, at Free, B.P., 12½ p.c., M.F.N., under tariff item 219a(1).

The Javex Company Limited noted that sodium hypochlorite in retail packages possibly would be classified under heading 38.11 and not under heading 28.31. Sodium hypochlorite is used for several purposes including disinfecting, bleaching and cleansing, but the company considered that the tariff considerations, as noted below, have little in common with agricultural and similar pesticides of heading 38.11.

It was suggested in the public hearing by the representative of Dominion Glass Company Limited that "Dogzoff", used for discouraging dogs from flowers or shrubs, and chemicals used for controlling soil drench, for damping off flowers and ornamentals should fall within the scope of B.T.N. heading 38.11.

The scope of B.T.N. heading 38.11, which the Industry Committee and the formulating companies suggested as the basis for a new item in the Canadian Customs Tariff, apparently would include most of the provisions of tariff items 209b, 219a, 219e and 208c and part of the goods dutiable under item 220a(ii), 250 and 791. Both classifications cover mixed products for pesticide uses. Unmixed products, including separately defined chemicals which might be imported under tariff items 219a, 250, 791 or some of the other existing tariff items would qualify for entry under B.T.N. heading 38.11 only if put up in forms or packings for pesticidal use.

Although the B.T.N. heading and the relevant Canadian tariff items cover approximately the same range of finished pesticides, there are some differences in the coverage of the two classifications. Some of the products covered by the tariff items but which would not necessarily always fall under B.T.N. 38.11 are: nicotine or salts of nicotine, (tariff item 209b and B.T.N. 29.42); single defined chemicals listed in tariff item 219e, i.e., chloropicrin (29.03), ethylene oxide (29.09), methyl bromide (29.02), methyl formate (29.14), cyanides (28.43), carbon bisulphide (28.15), acrylonitrile (29.27). Many other single separately defined chemicals could qualify for entry under tariff item 219a or 791 when used for the purposes indicated, whether or not imported in bulk. Examples of these products are phenol (29.06), creosote coal-tar (29.06 or Chapter 27), naphthalene (29.01), paradichlorobenzene (29.02), sodium propionate (29.14) and calcium propionate (29.14). However, if these chemicals are put up in packages for retail sale as pesticides they would fall under B.T.N. heading 38.11.

B.T.N. heading 38.11 includes alcoholic preparations excluded from the tariff item 219a, but covered by item 220a(ii). Further, the Brussels heading does not specify the package size as is explicit in tariff item 219a.

There is no provision in B.T.N. heading 38.11 to correspond to the general provision for materials as contained in tariff item 791. Active materials as well as inert materials, when used for manufacturing preparations under tariff items 209b and 219a, qualify for free entry under item 791. Products capable of being used as insecticides and pesticides, but to be further processed into other insecticides and

pesticides qualify for entry under tariff item 791. Also packaging materials for containing products defined under tariff items 209b and 219a qualify for entry under this item, while materials for the manufacture of such containers are eligible for duty drawback as provided by drawback item 1026. As there is no specific B.T.N. heading covering these products, they would fall under various other items if item 791 were deleted from the Customs Tariff.

The Industry Committee suggested that tariff item 791 be retained in one form or another. However, if item 791 were to relate to materials for use in the manufacture of products of B.T.N. heading 38.11 instead of existing items 209b and 219a, its scope might be somewhat more restricted than at present. Moreover, the Industry Committee's general position was that tariff item 791 should apply only to materials other than chemicals and that rate considerations for chemicals should be based on proposals made before the Board under Reference 120.

S.C. Johnson and Sons, Ltd. and the other formulators of household pesticides associated in the submission requested that mixtures of pyrethrum concentrates (pyrethrins), synergists and other biologically active materials combined with pyrethrins and synergists, when imported for use in the manufacture of pesticides, be included in item 791. These products, the companies considered to be not made in Canada. Kent Chemicals Limited proposed that the importation of materials for use in the manufacture of warfarin (a rodenticide) be maintained under item 791.

Drawback item 1026, which provides for a drawback of 99% of the duty paid on materials when used in the manufacture of containers for articles entitled to entry under tariff item 219a, also has no corresponding provision in the Brussels Tariff Nomenclature. The drawback item is mostly used by manufacturers of the containers for disinfectants and pesticides. The Dominion Glass Company suggested that if containers are excluded from item 791, or any successor item, the company would not ask for any special provisions for materials for use in the manufacture of their products, and would not object to the deletion of drawback item 1026. If, however, containers for use in packaging pesticides are maintained in item 791, the company would suggest the retention of item 1026.

Proposals re Rates of Duty

Thirty-five companies and associations were represented in the nineteen submissions made specifically on B.T.N. heading 38.11. Two proposals dealt with rate considerations for the full range of pesticides. One of these, by seven formulating companies, sought protection for pesticide production; the other, by the National Farmers Union, opposed increases in the tariff. The seven formulators accounted for about one half of the total production of finished pesticides in Canada in 1961.⁽¹⁾ The National Farmers Union, supported by the Canadian Federation of Agriculture, represented the agricultural industry, the largest single user. The submissions of the other interested parties are dealt with below, following the outline of the two broader proposals.

⁽¹⁾ Transcript, Vol. 108, p. 16387

The seven formulating companies which made a joint submission before the Board were:

<u>Company</u>	<u>Address</u>
A.H. Howard Chemical Company Limited	Orangeville, Ontario
Allied Chemical Services Limited	Calgary, Alberta
Chipman Chemicals, Limited	Hamilton, Ontario
Gallowhur Chemicals Canada Limited	Lachine, Quebec
Manchester Products Limited	Galt, Ontario
Niagara Brand Chemicals	Burlington, Ontario
Green Cross Division of Sherwin Williams Co. of Canada Ltd.	Montreal, Quebec

The companies made the following proposals:

"(1) Brussels heading 38.11

Disinfectants, insecticides, fungicides, weed-killers, anti-sprouting agents, rat poisons and similar products, put up in forms or packages for sale by retail or as preparations or as articles (for example, sulphur treated bands, wicks and candles, fly-papers).

	<u>British Preference</u>	<u>Most Favoured Nation</u>
Regardless of container size in lieu of present items 219(a) and 209(b)	15%	20%

"(2) When for use in the manufacture of goods described by heading 38.11, and when not made in Canada, the biologically active chemicals listed in Appendix 11.

	<u>British Preference</u>	<u>Most Favoured Nation</u>
	Free	Free

Present tariff items 791
and 219(e) to be cancelled
if rates proposed under (1)
above are granted.

"Proposal (2) above is based on the realization that a duty on biologically active materials, not made in Canada, would increase the prices of pesticides to Canadian users without producing off-setting advantages for any segment of industry.

"It is noted that Appendix II, as at present constituted, contains the formulating industry's current information as to the available biologically active ingredients in which Canadian formulators have an interest. It is anticipated that, from time to time as new active materials are developed, requests to the appropriate authority for their duty-free entry may be expected.

"The signatories of this brief share the view of the Chemical Industry Committee that, when a biologically active chemical, now on Appendix II, is made in Canada, it should become subject to the duty rates which have been recommended for the appropriate B.T.N. heading."(1)

The companies' Appendix II contained a list of 67 specific chemicals classified principally under 12 headings from B.T.N. 29.22 to 29.45 (See Appendix III). Paris green of heading 29.45, if dry, is dutiable under item 250.

The National Farmers Union of Canada, while opposing any tariff increase on imported pesticides, expressed the following view:

"The National Farmers' Union wishes to express its opposition to any changes in tariff structures affecting the importation of the chemicals used in the manufacture and/or formulation of pesticides. Such protection, we submit, is not needed by the industry and would lead to higher production costs for farmers."(2)

The position taken by the National Farmers Union received support from a submission by the Canadian Federation of Agriculture, a national farm organization comprised of several farmers' agencies. The Federation made a general submission on the pesticides industry and on Reference 120 as a whole. As a part of this representation, the Federation opposed increases in duties on pesticides. The Federation had no objection to any technical improvements in the Canadian Tariff Schedule for administrative convenience, unless these changes were to result in increases in rates of duty on the products covered.

The basic position taken by the Federation on the Chemical Reference was:

"(a) That there is a strong presumption in national policy in Canada against raising tariff rates, or increasing the level of protection by other means.

"(b) That particular reference to this presumption is contained in the instruction to the Board in The Reference that 'In drawing up a revised schedule the Board should keep in mind the obligations and procedures of the General Agreement on Tariffs and Trade.'

"(c) That in our view the submission of the Chemical Industry Committee presents no convincing argument for making an exception of the chemical industry and increasing the level of protection to it."(3)

(1) Transcript, Vol. 108, p. 16332-3

(2) Same, Vol. 107, p. 16248

(3) Same, Vol. 110, p. 16618

In regard to pesticides, the Canadian Federation of Agriculture stated the following views:

"The bulk of imports of pesticides come into Canada duty-free under tariff items 208c, 209b, 219a(ii), 219e and 250, and 791

"It is our recommendation that duty-free entry of pesticides, and materials for the manufacture of pesticides be ensured, on the basis of the identification of these products by their end use. This is the intent and the effect of the tariff now."⁽¹⁾

Naugatuck Chemicals Division of the Dominion Rubber Company Limited, a manufacturer of certain biologically active ingredients supplied to the formulators, supported the companies' proposals in a statement to the Board:

"Naugatuck Chemicals supports their request for duty rates necessary to ensure for them a maximum share of the Canadian market for formulations.

"We have noted that the formulators have requested duty-free entry for various biologically active chemicals which they use in their formulation, while such chemicals are not made in Canada. We have reviewed this list and make no objection to any of the chemicals included therein. None of these is made in Canada by Naugatuck Chemicals or by anyone else as far as we are aware."⁽²⁾

S. C. Johnson & Sons Limited, Colgate-Palmolive Limited, Canada Rex Spray Co. Limited, Aerocide Dispensers Ltd., P. Leiner & Sons (Canada) Limited, Cartier Chemical Co. Limited, Natural Products Corporation, Shulton of Canada Limited and Connecticut Chemicals (Canada) Limited made a statement as importers, manufacturers, packagers or distributors, principally of household type pesticides. These parties, while agreeing in principle with the proposals by the other formulators suggested some amendments.

"The above mentioned companies agree with the basic principles expressed in this brief, but feel that certain facts of a more specific nature should be drawn to the attention of the Board for purposes of clarification and recommendation.

"The parties to this statement submit that not only biologically active chemicals but also concentrated mixtures of biologically active chemicals in suitable solvents when for use in the manufacture, formulation and packaging of goods described by Brussels heading 38.11 and when not made in Canada, should be permitted duty-free entry."⁽³⁾

The biologically active concentrated mixtures for which the parties requested free entry are mixtures of pyrethrum concentrates (pyrethrins), synergists and other biologically active materials

(1) Transcript, Vol. 110, p. 16631-2

(2) Same, Vol. 109, p. 16435

(3) Same, Vol. 109, p. 16436-7

combined with pyrethrins and synergists which are not manufactured in Canada. Some of these products are mixtures of pyrethrins, or Allethrin with piperonyl butoxide and/or N-octyl bicycloneptene dicarboximide and such mixtures plus biologically active chemicals, for example, methoxychlor, thanite, DDT, aldrin, dieldrin, lindane, lethane and cube resin. Imported concentrates are said to require further processing before they can be marketed, and should be regarded as materials rather than finished preparations.

These companies objected to the cancellation of tariff item 791 because it provides not only for chemicals but also for other materials, such as packaging materials, in which the parties are interested. They stated:

"we most strongly protest the complete cancellation of tariff item 791 as it applies to components of pesticidal products (put up in packages of 3 lbs. or less) not manufactured in Canada...

"In the event that the Board should decide that all items under B.N. 38.11 should be imported duty-free, we most strongly recommend that the protection afforded Canadian manufacturers of products when in packages not exceeding 3 lbs. each, gross weight, be maintained at the existing tariff rate as set down in tariff item 219a(i)(12½%)." (2)

The interest of the companies in the smaller package size arises from the fact that they produce principally household type products which they put up in the smaller packages, frequently in aerosol spray containers.

Nopco Chemical Canada Limited expressed interest in special emulsifiers which are made by its parent company in the United States and used to put biologically active ingredients into solubilized form or readily emulsifiable form. The company claimed that in many instances these emulsifiers could be made in Canada by Nopco or some other company provided some duty protection was provided. Consequently, the company sought protection for emulsifiers at rates of 15 p.c., B.P. and 20 p.c., M.F.N., to encourage the production of these products in Canada.

These emulsifiers apparently would fall under B.T.N. heading 38.19; they are at present imported free of duty under tariff item 791. The company noted that "should this proposal of the formulators [companies' proposal] be given favourable consideration and be adopted, then we propose that 'end-use' tariff item 791 be abrogated...which is only in accordance with their request." (2)

The company further proposed that certain materials used in emulsifiers, and which are not made in Canada, should continue to be entered free of duty as they do under item 791. These materials include "calcium and 'M'-soaps, or mahogany sulphonates".

(1) Transcript, Vol. 109, p. 16439-40

(2) Same, Vol. 109, p. 16463

Nuodex Products of Canada, Limited, engaged in the production of phenyl mercury compounds used for preventing fungal or bacterial damage and at present imported under end-use item 219a(2), sought protection on these compounds. The phenyl mercury solutions manufactured by the company in Canada are di (phenyl mercury) dodecenyl succinate, phenyl mercury oleate and phenyl mercury acetate. The first two compounds are used principally in preventing fungal growth on paint and coatings; the last one, having broader application, is used as a slimicide in the pulp and paper industry, as a seed disinfectant and in a variety of other uses. The company stated:

"The foregoing materials are made from intermediates imported into Canada which currently enter duty-free. We ask that these intermediates which are concentrated mercury compounds retain duty-free entry until made in Canada, however, we ask that the solutions of the three phenyl mercury compounds listed above which we manufacture in Canada, be granted protection on the basis of

B.P. - 15%

M.F.N. - 20%

when imported in any quantity.

"The production facilities of Nuodex Products of Canada, Limited, are adequate to supply the entire Canadian market for these products."(1)

Labatt Industries Limited, McArthur Chemical Co. Ltd., and Witco Chemical Company produce sodium propionate and calcium propionate which are used principally in the bakery industry as mould and rope inhibitors. The products normally enter Canada under tariff item 711 at 15%, B.P. and 20%, M.F.N. When used as mould and rope inhibitors in the baking industry, they are classified under tariff item 219a, free of duty if in large quantities. These bakery uses were said to account for more than 98 per cent of the total use in Canada. The parties sought the following tariff treatment:

"Our understanding of tariff item 219a is that it was set up primarily as an assistance to agriculture. Under the circumstances we feel that the baking industry is quite remote from agriculture and that sodium propionate and calcium propionate should be ruled, as the Industry Committee has recommended, under duty rates of 15% B.P. and 20% M.F.N. We support this recommendation.

"Propionic acid is used as a raw material in the preparation of sodium propionate and calcium propionate. We feel it should enter Canada on a duty free basis until such time as it is classed as 'Made in Canada'."(2)

Propionic acid now enters duty-free under item 791; it is classified by B.T.N. heading 29.14.

(1) Transcript, Vol. 109, p. 16519

(2) Same, Vol. 109, p. 16534-5

As a supplement to the briefs submitted for the hearing of September 10, 1962, Cobalt Refinery Limited, a producer of arsenic trioxide, sodium arsenite and cobalt oxide, seeking protection on these products, stated:

"we request a duty of 15 & 25% against British Preferential and Most Favoured Nation, as the 25% is needed to effectively protect us against cheap European refined arsenic. We should perhaps add that for adequate protection, there should be, also, a similar tariff authorized on Sodium Arsenite as most of the refined arsenic is used to produce Sodium Arsenite (43% Arsenic Trioxide - 11% Caustic Soda, balance water)."(1)

It was claimed that most of the sodium arsenite is used in agricultural applications.

Kent Chemicals Limited, a manufacturer of warfarin (3-alpha-acetonyl benzyl)-4-hydroxycoumarin), the most widely used rodenticide, imports raw materials for the manufacture of this product under tariff item 791. The company has imported materials not made in Canada, stating that it uses Canadian materials whenever they are available. The company requested that there be no change in tariff items 791 and 219a, and that a new tariff item be enacted to allow duty-free entry of materials used in warfarin. The submission stated:

"We ... respectfully request that tariff item No. 791 and No. 219a be maintained.

"More specifically, we ask that a new tariff item be enacted allowing the duty-free entry of 'Materials used in the chemical synthesis of Warfarin'. "(2)

Shell Oil Company of Canada, Limited formulates agricultural chemicals such as emulsifiable concentrates, wettable powders, dusts, dust concentrates, granular preparations; the company also repacks phosdrin and D/D agricultural chemicals for marketing. The company imports the following agricultural chemicals in bulk from Shell Chemical Company, U.S.A., for further formulation in Canada: aldrin, dieldrin, endrin, phosdrin, nemagon, D-D and vapona. It requested that these basic agricultural chemicals, now imported duty-free under tariff item 791, continue to be imported free of duty. These chemicals are not made in Canada. (3)

Thomas Rostrom and Company represents in Canada Scientific Chemicals Inc. of Chicago which produce materials containing fungicides and bactericides used to protect such products as textiles, fire hose, wood products, leather and twine. The company imports these products and, since the products include highly complex organic compounds, the company proposed that they be considered separately from heading 38.11 and continue to be allowed duty-free entry. The company stated in its submission:

(1) Transcript, Vol. 109, p. 16544

(2) Same, Vol. 109, p. 16547

(3) Same, Vol. 109, p. 16556-7

"we feel that such fungicides and bactericides should be considered by themselves, and that they should remain at the same status as they are now - duty free under Item 219a."(1)

Chemical Specialties Association, Division of Propas Chemical Limited, as a small formulator, suggested that the rates of duty are not required for item 219a(1) if item 791 continued to provide duty-free entry. The company stated in its submission:

"With the use of Tariff Item 791 for importation of raw materials, such as emulsifiers, specialized packaging products etc., and raw materials, such as basic chemicals, it has been possible for the Canadian formulator to manufacture economically and to compete on a world wide basis.

"This has resulted in many cases with lower prices to the Canadian farmer for Herbicides and other Pesticides, than prevalent to the U.S. farmer.

"Therefore, protection is not required by extra tariff on 219a(1), to the Canadian formulator, providing his raw materials remain free under tariff item 791."(2)

"The importation of finished products, in bulk, are purchased mainly by the formulator, and protection if desired by the formulating industry should not include finished formulations as purchased by the formulator."(3)

A spokesman for the group of seven large-scale formulators objected to the position taken by Chemical Specialties Association, noting that the company spoke principally as an importer rather than as a Canadian formulator.

Moran Chemical Company Limited is engaged in the production of moth preventative insecticides and related products. It imports naphthalene and paradichlorobenzene as raw materials. The company requested that these chemicals continue to be allowed duty-free entry.

"It is submitted that both naphthalene and paradichlorobenzene when imported for use as moth preventives and insecticides should continue to receive the same tariff treatment as is now provided under item 219a(2)."(4)

It was claimed that the naphthalene produced by Dominion Tar and Chemical Co. Ltd. and Record Chemical Co. Inc. is not the same as that used by Moran Chemical Company. Similarly, suitable paradichlorobenzene was said to be not made in Canada.

(1) Transcript, Vol. 109, p. 16558

(2) Same, Vol. 109, p. 16498-9

(3) Same, Vol. 109, p. 16501

(4) Same, Vol. 109, p. 16560

Javex Company Limited made a statement under B.T.N. heading 38.11 on sodium hypochlorite when put up in retail packages. The company noted that sodium hypochlorite is classified by B.T.N. heading 28.31, under which heading Javex Company had proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. Some uncertainty was expressed concerning classification of the product if packaged for sale at retail because it might not necessarily be considered as a pesticide under B.T.N. heading 38.11. The company proposed that rates of 15 p.c., B.P., 20 p.c., M.F.N. apply to the product regardless of whether it is in bulk or in small packages. If the packaged form is classified by B.T.N. heading 38.11, these rates would then apply under that heading.

The spokesman for Javex Company drew attention to differences between sodium hypochlorite in solution and most of the products which would be classified under B.T.N. heading 38.11.

"We do not participate in the pesticides products industry, and have no wish to enter into the discussion, or make statements about the tariff status of that industry. Sodium hypochlorite is a multi-purpose product, and the disinfectant properties which it possesses among other properties should not lead the Tariff Board to adjudging its tariff needs by the criteria which apply to agricultural pesticides, or other products of nature completely unrelated to sodium hypochlorite in solution, either in the type of uses to which these products are put, or the type of user."(1)

In any event, as noted above, the company was proposing rates of 15 p.c., B.P., 20 p.c., M.F.N. for the packaged forms whether or not classified under B.T.N. heading 38.11.

Anchor Cap and Closure Corporation, a manufacturer of metal and plastic closures for glass, metal and plastic containers, requested amending legislation to make tariff item 791 apply only to:

"1. Tariff item 219a(2)

"2. Tariff item 209b - with a restrictive clause, similar to 219a limiting the free importation of materials only for those packages over three (3) lb.

"We further request that these closures imported for use in Canadian-made preparations under three (3) lbs. be subject to duty under tariff items 432d or 908, as applicable."(2)

The rates of duty under tariff items 432d and 908 are 15 p.c., B.P., 20 p.c., M.F.N.

The closures produced by the company are for small aerosol spray cans for containing disinfectants and insecticides for use principally in houses and gardens.

(1) Transcript, Vol. 109, p. 16549

(2) Same, Vol. 109, p. 16573

Dominion Glass Company Limited manufactures glass containers for disinfectants, insect sprays, lawn and shrub insecticides for products falling under tariff item 219a(1). These containers may be imported free under tariff item 791. The company as noted above, requested that tariff item 791 no longer apply to containers which, in the company's opinion, should be dutiable under tariff item 326 where rates of duty of 15 p.c., B.P., 20 p.c., M.F.N. are provided for a variety of glass containers. (1)

With regard to drawback item 1026, the company suggested:

"With respect to drawback item 1026, if containers are excluded from tariff item 791 or any successor item thereto which you recommend, we feel that we should not ourselves ask any special provision for materials for use in the manufacture of our products. Under such circumstances we would not object to seeing drawback item 1026 deleted from the tariff. However, should you make any recommendation which would provide special tariff treatment for containers for use in packaging products of the types now under review, we would in such event feel it necessary that item 1026 be also continued." (2)

The Canadian Pulp and Paper Association, expressing an interest in insecticides as a consumer, stated that the industry did not object to a revision of the Tariff for classification purposes, but must object most strenuously to any revision which would result in an increase over current tariff rates either at that time or in the future.

Relevant to heading 38.11, the Association expressed interest in insecticides used in forestry spraying and organo-bromine compounds used as slimicides.

Summary of Arguments

The main arguments put forward by the formulators who sought protection on pesticides were:

(a) Rates of duty of 15 p.c., B.P., 20 p.c., M.F.N. were said to be necessary for producers in Canada to secure the 40 per cent of the market being supplied by imports; the increased production would result in more employment in the pesticides industry and lower unit costs of production.

(b) The duties would not have any major effect on prices of pesticides to consumers.

"It is not expected that the duty requested would have a major effect on the overall prices of pesticides to consumers as long as the prices of the formulators raw materials are not increased. Greater volume of Canadian production should result in lower unit costs of formulation and distribution and keen internal competition among domestic formulators would discourage the enhancement of prices." (3)

(1) Transcript, Vol. 110, p. 16591

(2) Same, Vol. 110, p. 16591-2

(3) Same, Vol. 108, p. 16331

(c) Profit margins in the formulating industry are too low under the existing tariff arrangement. As noted earlier, a net profit of 2.26% on sales revealed in a confidential survey was considered low by the formulators for an industry in which the turn-over was largely on a one season basis.

(d) The high rates of duty in the U.S.A. on pesticides restricts potential Canadian production.

"Most formulated pesticides contain substances that are classifiable under the U.S. tariff as products derived in whole or in part from coal tar. For this reason formulated pesticides entering the U.S. would be dutiable under U.S. tariff items 27(a)(3)(5), which imposes rates of duty of 3½¢ per lb. plus 25% ad valorem. At present on U.S. distributor prices, these combined duties are equivalent to total ad valorem rates in the range from 30% to 50%."

At another stage in the public inquiry it was stated:

"Incidentally, on these pesticidal products, with the American duty of 30% - of course, these products don't all qualify under the same tariff item. The United States tariff is closer to 50% on the average than 30%"(1)

(e) The possibility of the establishment of more subsidiary plants in Canada.

"if a duty is placed on pesticides likely... [The American patentee] will more effectively secure a benefit on his patent in Canada by putting a plant in Canada to formulate this product or licensing somebody in Canada to do it."(2)

The other parties interested in particular chemicals and solutions or containers which are made in Canada sought protection to safeguard the production facilities. The products include: 2,4-D and 2,4,5-T acids and mixed esters, made by Naugatuck Chemical; emulsifiers and surfactants made by Nopco Chemical; mercury solutions made by Nuodex of Canada and arsenic preparations made by Cobalt Refinery. Anchor Cap and Closure Corporation of Canada, Limited and Dominion Glass Company of Canada Limited requested protection on the types of containers which they manufacture. Prices of most of these products were said to be competitive with prices of similar imported products.

The principal arguments against tariff protection for pesticides were made by the National Farmers Union. These arguments are summarized below.

(a) Protective rates of duty likely would result in higher prices of pesticides to farmers and reduce the variety of products available.

(1) Transcript, Vol. 108, p. 16328-9, 16375

(2) Same, Vol. 108, p. 16417

"Pesticides are now used extensively in farming operations in Canada. Not only is the volume of pesticidal preparations in use large: this volume is increasing year by year.

"Thus, their costs are of considerable significance in the Canadian farming economy. This is especially true with respect to those farmers who tend to specialize and, working on narrow margins between operating costs and market prices, depend upon efficiency of operations to earn a living."⁽¹⁾

"Tariffs would not only increase prices of chemicals used by agricultural producers; they would have the even more serious effect of limiting the range of pesticidal preparations available."⁽²⁾

(b) The domestic market is not, in any event, large enough to permit mass production of pesticides to obtain optimum economies of scale.

"It is true, having regard to the domestic market only, that scale of manufacturing operations for domestic chemical firm can never be as large as in the heavily-populated industrial nations. But the conferring of tariff protection upon the industry as regards its pesticides production would still not provide the industry with a domestic market large enough to permit mass production and optimum economies of scale. Only by exporting can the Canadian industry attain such mass production economies and thereby hope to develop research facilities sufficient to compete with current imports. Thus, more protection at this time would mean not only higher prices to farmers for the pesticides now on the market, but seriously restricted access to the badly-needed new chemicals and formulations being developed in dozens of laboratories around the world."⁽³⁾

(c) The margin of profit in farming is very small; higher costs of production will impose a serious burden on farmers.

"Agriculture is one of the most important sectors of the Canadian economy and its future is vitally dependent upon exports. The nature of our overseas market is such that higher production costs cannot be passed on to the purchasers of our produce but must be absorbed by the farmers themselves. The margin of profit in farming is now so small that higher costs would impose a serious burden on farmers."⁽⁴⁾

The other arguments put forward against tariff protection for pesticides include that of Chemical Specialities Association, as a small formulator. The company stated in its brief that any additional protection would result in restriction of trade and reduced employment.

(1) Transcript, Vol. 107, p. 16229

(2) Same, Vol. 107, p. 16247

(3) Same, Vol. 107, p. 16248

(4) Same, Vol. 107, p. 16248-9

"At present in Canada, there are only two or three manufacturers with complete facilities to formulate the wettable powders and granular pesticides. The smaller formulator, has to purchase his finished products custom made by one of his larger competitors. In many cases, rather than this taking place, U.S. manufacturers with equipment to grind and formulate wettable powders and granular insecticides and herbicides are utilized. The addition of their services on a custom basis, adds less than 10% to the cost of the finished products, for custom formulation.

"The price competition in the sales field, is not a result of finished formulations entering Canada in the wettable powder or granular form, causing a lower price for the Canadian products. The prices of the Canadian products are set by the Canadian manufacturers with facilities to formulate these pesticides. The major formulator, with complete equipment, finds it unattractive to sell to the smaller formulator at the prices that the U.S. custom packager or formulator will provide.

"Any tariff on finished formulations, which are presently being brought in by the smaller formulator and are for resale, would therefore, result in a weakening of the position of the smaller formulator in the market. In other words, the smaller formulator can purchase products and sell competitively to the rest of the industry at present."⁽¹⁾

Analysis of Proposals and Arguments

As has been noted, most pesticides and materials and articles used in their manufacture can now be entered into Canada free of duty, though a few exceptions exist. Preparations imported in packages not exceeding three pounds bear a rate of duty of 12½ p.c., M.F.N. and Paris green dry, an M.F.N. rate of 7½ p.c. Also pesticidal mixtures containing alcohol are subject to duty at a rate of 25 p.c. or more depending on the alcohol strength of proof. These exceptions to the general duty-free provisions are believed to cover a relatively unimportant part of Canada's imports or production of pesticides except possibly as related to excise taxes on alcohol.

Some of the formulators proposed that rates of 15 p.c., B.P., 20 p.c., M.F.N. should apply generally to pesticide preparations, while other manufacturers of particular preparations or closures or containers requested protection, usually at that level, for the products of their own manufacture. There was general agreement that materials used in the manufacture of the preparations and which are not made in Canada should continue to be entered free of duty, though the proposal by some formulators that these be restricted to a specified list of biologically active ingredients would reduce very materially the scope of the provision. Some parties proposed that the materials made in Canada should be dutiable at the above rates; others proposed more universal continuation of duty-free entry for materials. Some users of pesti-

(1) Transcript, Vol. 109, p. 16499-500

cides, particularly the agricultural and pulp and paper industries, proposed duty-free entry for both materials and preparations.

As mentioned earlier, it is difficult to assess the effect of the proposed duty; the Canadian import data on pesticides do not adequately distinguish between basic materials and finished preparations. Based on the average value of imports recorded in 1964, the effect of the proposed 20 per cent M.F.N. duty, if reflected directly in prices, as represented by the unit values of the products, would appear to be from about four cents to twenty cents per pound.

While increased employment in the pesticides industry might result from the proposed rates of duty, the labour component is not substantial in the formulation of pesticides. As pointed out earlier, direct labour cost is often less than the packaging cost, or less than 7 per cent of the total cost. The direct employment provided would, therefore, be relatively small, though some further employment could be expected to arise indirectly, for example in the containers industry.

The formulators' arguments that a duty on pesticides imported in bulk would not have a significant effect on prices of pesticides formulated in Canada because of the keen internal competition has to be considered in the light of some reduction of external competition and also of the possible price increases on Canadian-made materials used in the manufacture of pesticides. The effect of the duty might be less pronounced on prices, however, than on the flow of new formulations, specialized formulations, biologically active materials and mixtures or concentrates of basic ingredients.

As mentioned earlier, in an industry in which purchased materials account for a large part of the sales dollar, it is not unusual to find a low ratio of profit to sales. The data are not available to allow the rates to be expressed on the basis of capital investment, nor to analyse what the effect on profits might be, either for manufacturers of pesticides or for the users, if the proposed rates of duty were directly reflected in prices.

The companies' proposal in regard to the free entry of biologically active ingredients restricted to the list provided by them (their Appendix II) would result in a much reduced scope of existing tariff item 791. The reduction in coverage of the item undoubtedly would be large; the restriction of scope, however, would probably have greater impact on the suppliers of many other chemicals and materials, who did not make representations specifically on tariff item 791, than it would on those who supply biologically active materials. Some biologically active ingredients are made in Canada, and imports of them constitute a small part of the range of materials now being supplied to the Canadian market by imports under tariff item 791.

In a somewhat different category are the two proposals concerning containers for pesticides. Anchor Cap and Closure Corporation of Canada, Ltd. and the Dominion Glass Co. of Canada Ltd. objected to the free entry of the closures and the glass containers under item 791, though the extent of hardship was not elaborated upon. Dominion Glass noted that if the containers were not admissible duty-free, as under tariff item 791, the provision for materials for use in their manufacture, contained in drawback item 1026 could be deleted.

With regard to the National Farmers Union's argument against any duty on pesticides used by agriculture, the effect of the proposed duties on the costs of production and of agriculture is difficult to assess. While any increase in costs would not be large relative to other costs and hazards of agricultural production, there remains the question of whether there is substantial reason for removing the existing duty-free provisions.

The Canadian Pulp and Paper Association, as a consumer of certain insecticides used in the pulp and paper industry, requested continued free entry for such products. The effect of the proposed rates of duty on the pulp and paper industry presumably would be less than that for agriculture, though there are a number of similarities to the situation in agriculture.

The proposals by a number of companies concerned products in which they had a direct interest as producers and for which they generally favoured rates of duty of 15 p.c., B.P., 20 p.c., M.F.N. Products for which protection was specifically sought included 2,4-D and 2,4,5-T acids and esters and mixed acids or esters, certain emulsifiers used in the formulation of pesticides, phenyl mercury compounds, sodium propionate and calcium propionate, arsenic trioxide, sodium arsenite and cobalt oxide. Many of these products exist as separate, chemically defined compounds and are discussed under their appropriate B.T.N. heading.

Products for which free entry was specifically sought, at least while they are not made in Canada, were insecticidal concentrates such as pyrethrins, piperonyl butoxide and petroleum distillates intermediary products used in phenyl mercury acetate solutions, such as zinc naphthenate solution, zinc naphthenate emulsions and phenyl mercury acetate; 3-(alpha-acetonyl benzoyl)-4-hydroxycoumarin, used in warfarin; emulsifiable concentrates such as wettable powders, dust concentrates of aldrin, dieldrin, endrin, phosdrin, nemagon, D-D agricultural chemicals and vapona; naphthalene and paradichlorobenzene used as moth preventives, and a number of other biologically active ingredients and concentrates. Some companies, moreover, proposed free entry for preparations if imported in bulk quantities, and a duty on preparations if imported in small packages in order to protect their position as packagers of household-type products.

The Board has not the necessary information to assess in detail, in each case, the position of each of these companies under the present circumstances of general duty-free entry, nor to assess the change in the fortunes of each company which might be expected to follow if the various proposals were adopted. In the main, therefore, apart from particular chemicals under other B.T.N. headings, these specific representations are considered to be, in effect, similar to the representations made in the general proposals by formulators for rates of 15 p.c., B.P., 20 p.c., M.F.N., or those by the consumers for duty-free entry.

The increasing proportion of the Canadian market supplied by the domestic formulating industry and the lower or equal prices which were said to prevail in Canada for pesticides as compared with those in the U.S.A. and the close relationship between the active ingredients which are not made in Canada and the formulations prepared from them

seem to suggest that the domestic formulating industry has been capable, through the years, of adjusting to the existing duty-free market conditions in terms both of broadening the scope of its operations and of taking advantage of the fruits of the much more extensive research facilities abroad. Perhaps without important exception all of the principal suppliers of pesticides in Canada import materials, mixtures or finished formulations either to further their own manufacturing operations or to round out the lines of products which they can offer. While many of the imported materials and preparations compete with products made in Canada, many are not available from, or directly competitive with, Canadian production; for some there is no satisfactory substitute and some are new products, not yet prepared in this country.

The proposed duties of 15 p.c., B.P., 20 p.c., M.F.N. were deemed generally by the chemical industry, if applied uniformly to chemicals and chemical products, to be both "moderate" and "adequate" and, in general, not capable of precise defence. With respect to pesticides, for example, no submissions dwelt upon the need for a British preferential rate of 15 p.c.; very little was said about actual or potential imports from countries entitled to the British preferential rate. The proposed British preferential rate might be regarded, therefore, as a proposal for uniform rates throughout the chemical industry.

Similarly, very little attempt was made to equate the 20 p.c., M.F.N. proposal with precise need, an exercise which the chemical industry in general regarded as futile. With respect to that rate for pesticides, one spokesman noted:

"I did suggest that while twenty per cent may be a little more than is necessary ... it may well be that the Board, after examining all the facts, decides that it ought to leave Item 791 in substance in the Tariff, that something less than twenty per cent might do." (1)

Another spokesman, with reference to the proposal by his company observed, "I really used the fifteen and twenty to simplify the matter". (2)

The pesticides industry is a fast moving industry; there is a continuous flow of new pesticides being developed replacing the older ones, and most of the research and development in this field is done outside of Canada. Since these newly developed pesticides are relatively expensive in their initial use, a duty on pesticides will hinder their entry into Canada and thus deprive, to that extent, the Canadian users of the benefit of more potent pesticides. The Canadian pesticides industry is engaged chiefly in formulating preparations rather than in manufacturing the basic, biologically-active ingredients. Except for some of the ingredients which are made in Canada, the general consensus at the hearing was that the materials should continue to be entered free of duty. The materials constitute a very large part of the value of the bulk preparations, with the result that the proposed rates on preparations represent much higher effective protection than the nominal rates suggest. Any preparations which can be formulated

(1) Transcript, Vol. 109, p. 16531-2

(2) Same, Vol. 109, p. 16530

and packaged locally in a given market area also gain a competitive advantage in that area over the product which is packaged at some distant plant, whether it be in Canada or abroad. Similarly, if a Canadian formulator is not located in or near a particular market area, the imposition of a duty is very likely to increase the cost of pesticides to users in that area.

Trisodium Phosphate Chlorinated - B.T.N. 38.11

In addition to the submissions presented during the public hearing on pesticides in November 1962, a number of submissions on individual chemicals throughout the course of other hearings had some relevance to the consideration of pesticides. Some of the individual chemicals have been noted above in this presentation on pesticides and some, where the pesticide interest was only one of a number, are discussed under the heading dealing with the particular product.

At the hearing on products of B.T.N. heading 28.48, early in 1961, a submission was made by the Diversey Corporation Canada Limited on a product known as "Diversol", the trade name for a preparation of trisodium phosphate chlorinated. Because of the form in which the product is usually sold, the uses which it generally serves and the tariff item which applies to it, the submission by the Diversey Corporation is presented here as part of the interest expressed in pesticide preparations of B.T.N. heading 38.11. Moreover, although representations for trisodium phosphate chlorinated were made to the Board at the hearing for products of B.T.N. heading 28.48, some preparations of the product might be classified under heading 38.19.

The Diversey Corporation Canada Limited, a wholly-owned subsidiary of the Diversey Corporation of Chicago, Illinois, began manufacture of the product in Canada in 1950 at Clarkson, Ontario, and has since established plants at Montreal, Quebec; Calgary, Alberta; and St. John's, Newfoundland. The spokesman for the company said that more than 95 per cent of the material sold in Canada was manufactured by the Canadian plants.

There are no public data available regarding the size of the Canadian market for "Diversol", the brand name under which Diversey sells trisodium phosphate chlorinated both in Canada and in the U.S.A., and none are available regarding other aspects of production or distribution. The company informed the Board that in 1960 it employed about 150 persons. This suggests that "Diversol", which the company spokesman said was one of its most important products, had a fairly substantial value of sales. It has a variety of uses in cleaning and disinfecting; for example, it is one of the standard solutions used for cleaning dairy equipment and utensils.

Trisodium phosphate chlorinated was entered, free of duty, under tariff item 219a(2) and end-use item 791. However, because of a change in the wording of tariff item 219a, the product is understood to be dutiable at present under tariff item 220a(1) at 15 p.c., B.P., 20 p.c., M.F.N.

The Diversey Corporation proposed:

"That trisodium phosphate chlorinated should be specially and separately provided for in the customs tariff and that the duty should be British Preferential 15 per cent and Most-Favoured-Nation 20 per cent."⁽¹⁾

The company spokesman supported his proposal, saying:

"the Diversey Corporation (Canada) Limited in building a plant in Canada capable of supplying Canadian needs, and having obtained a made-in-Canada ruling, should receive that measure of tariff protection usually accorded sodium phosphate manufacturers in Canada."⁽²⁾

In a more general statement, he made reference to larger plants in the U.S.A. and the high cost of transportation arising out of serving the more dispersed Canadian market.

As already indicated, there are no published data regarding any of the economic aspects of producing or distributing trisodium phosphate chlorinated. Moreover, the company spokesman gave no indication whether the Canadian plants of the Diversey Corporation were encountering difficulties as a result of competition from the U.S.A. or other countries. The decision by the company to establish production facilities in Canada was made under the then existing, duty-free tariff situation. Diversey had been distributing its product in Canada, first from the U.S.A. and then through its Canadian subsidiaries, for many years before it decided to produce trisodium phosphate chlorinated in Canada.

At an earlier hearing, in September 1960, the Electric Reduction Company of Canada Limited, in a general submission, recommended rates of 15 p.c., B.P. and 20 p.c., M.F.N. for all chemicals "unless it is established that other rates are more appropriate for specific chemicals or groups of chemicals."⁽³⁾ Trisodium phosphate chlorinated was listed in the company's brief with a recommendation for those rates. The company considered that the product was a mixture, dutiable as such under tariff item 220a(i); at that time, as noted above, the product's use as a disinfectant permitted its entry free of duty under item 219a.

No other representations were made to the Board relating specifically to trisodium phosphate chlorinated.

With respect to classification of the product in the Brussels Nomenclature, the spokesman for Diversey Corporation observed that the trisodium phosphate chlorinated of its manufacture was being used more as a cleaner than as a disinfectant; this suggests classification as a single chemical of B.T.N. 28.48 or as a miscellaneous preparation of B.T.N. heading 38.19 rather than as a pesticide of heading 38.11.

(1) Transcript, Vol. 30, p. 4436

(2) Same, Vol. 30, p. 4435

(3) Same, Vol. 4, p. 673-4

PREPARED GLAZINGS, PREPARED DRESSINGS AND
PREPARED MORDANTS, OF A KIND USED IN THE TEXTILE,
PAPER, LEATHER OR LIKE INDUSTRIES - B.T.N. 38.12

The products classified under this heading are mixtures of various substances which are usually applied either during the finishing process, in order to impart certain characteristics to materials such as yarns, fabrics, paper and leather, or during the dyeing or printing processes to facilitate fixation of dyes on such materials.

Prepared glazings and dressings, sometimes also known as finishing preparations, include mixtures based on starchy substances, vegetable gums, rosin shellac, artificial resins and waxes. They include prepared sizes used in the manufacture of yarns, fabrics, paper and leather to enhance stiffness, strength, smoothness or weight, preparations for waterproofing fabrics, and opacifying preparations for de-lustring man-made fibres.

Prepared mordants consist mostly of water-soluble substances capable of combining with dyes and textile fibres, thus facilitating and improving the adherence of dyes to fibres. Such preparations are usually based on metallic salts, oxides or hydroxides, in which case they are known as metallic mordants, on tannic acid and various substances rich in tannic acid, known collectively as acid mordants, and on numerous other substances, such as sulphurised phenols or sulphonated sulphurised phenols.

Not all of the products covered by heading 38.12 are properly before the Board; rosin sizing specifically covered by tariff item 39e, the preparations having the quality of starches classified under tariff item 39(ii), the leather dressings dutiable under tariff item 252, and the preparations based on shellac classifiable under item 254(4) are not within the Board's terms of reference.

Because of the great variety of products and the considerable variation in their composition, there is no clearly defined industry comprising the firms engaged in the manufacture of the products under discussion. During the public hearing, however, some seven firms were reported to be engaged in the manufacture of finishes for the leather, textile and paper industries; two of these, namely Hercules Powder Company (Canada) Limited, of Montreal, P.Q. and Nopco Chemical Canada Ltd., of London, Ontario, made representations to the Board concerning these products. In addition, in its Chemical Directory, 1960, the Dominion Bureau of Statistics lists thirteen other firms among the manufacturers of leather dressings and finishes, and fifteen among the producers of textile and leather specialties. Some of these firms are engaged in the manufacture of other products as well. On the other hand, there may be firms which manufacture some of the preparations under discussion, but which are not listed separately in the Chemical Directory and whose existence is not known to the Board.

Information concerning Canadian shipments and imports of the products under discussion is also very limited. Official statistics show Canadian shipments of leather dressings and finishes to have been valued at \$1.7 million in 1962, the latest year for which information

is available;(1) shipments of textile and leather specialties during the same year were valued at about \$5 million; it is very likely, however, that both of these figures include products other than those covered by heading 38.12.

Imports of sizing preparations (s.c. 1846) amounted to \$344,000 in 1962 and \$242,000 in 1963, while imports of animal, mineral and vegetable oils for textile applications (s.c. 1625) were valued at \$608,000 in 1962 and \$782,000 in 1963. It is not possible to establish to what extent these imports consisted of commodities within the scope of the present heading or Reference nor to what extent they competed directly with similar products manufactured in Canada. The Canadian markets for some of the groups of products respecting which the Board received representations are discussed later in this section.

The products covered by B.T.N. heading 38.12 are at present classified for customs purposes mostly as follows:

Product	Tariff Item No.	Rates of Duty	
		B.P.	M.F.N.
Prepared glazings and dressings:			
Leather dressings	252*	12½ p.c.	17½ p.c.
Preparations having the qualities of starch	39(ii)*	1¢/lb.	1½¢/lb.
Rosin sizing	39e*	5 p.c.	7½ p.c.
Prepared sizes other than rosin sizing)			
Preparations based on shellac or artificial resins)	220a(i)	15 p.c.	20 p.c.
Preparations for waterproofing fabrics)	254(4)*	Free	Free
Opacifying preparations)	904	15 p.c.	15 p.c.
Prepared mordants:			
Iron liquor	203	Free	Free
Red liquor	203	Free	Free
Chemical compounds composed of two or more acids or salts soluble in water, adapted for dyeing or tanning	203a	Free	Free
Other	220a(i)	15 p.c.	20 p.c.

*Not in Reference 120

No information is available concerning the distribution of imports of the products under consideration between the various tariff items listed above.

The Industry Committee proposed that the wording of B.T.N. heading 38.12 be adopted for the classification of the products under discussion, and endorsed the rates of 15 p.c., B.P. and 20 p.c., M.F.N. requested by Canadian manufacturers. The Committee also recommended that tariff item 39e, providing specifically for rosin sizing, "be relocated within the framework of Heading 38.12 in order to preserve the entirety of its classification structure." The Committee did not make reference to the other tariff items which are not properly before the Board and under which some of the products covered by heading 38.12 are at present classified.

Nopco Chemical Canada Ltd., of London, Ontario proposed on its own behalf and that of its subsidiary, Canadian Aniline & Extract Co., Limited, of Hamilton, Ontario, rates of 15 p.c., B.P. and 20 p.c., M.F.N., for B.T.N. heading 38.12. In its submission, the company stated that the products manufactured by it and its subsidiary would fall mostly under the designation "prepared dressings of a kind used in the tanning, textile, paper or like industries", and that they are at present classified for customs purposes under tariff item 711 or 220a(i), at 15 p.c., B.P. and 20 p.c., M.F.N. The submission went on to say:

"It is our opinion that only the protection we have had under the tariff items as enumerated above has enabled us to compete successfully with ... large volume foreign producers whose raw material costs and costs of production are often substantially below those existing in Canada."⁽¹⁾

The preparations manufactured by Nopco and its subsidiary include: preparations for use on leather, textiles and paper; textile softening preparations; surface sizing preparations for textiles and paper; and flame and water retardants. Many of the leather preparations appear to be mixtures of oils and fats which probably are classified under B.T.N. headings other than 38.12, such as heading 34.03. The present heading might relate to about one-half of the two companies' sales.

In its submission, Nopco referred to material costs and costs of production abroad as being substantially below those in Canada. However, with respect to prices of similar products in Canada and the United States, the company's representative stated, "In most cases they are fairly comparative. They might be within one or two cents per pound."⁽²⁾

Hercules Powder Company (Canada) Limited, of Montreal requested that, for the protection of Canadian production of wax and wax-rosin emulsions, "the current tariff duty of 15% BP, 20% MFN, 25% General be retained with the subject products properly classified and defined under tariff item 220a(i)." The company stated:

"The products of our interest are currently imported into Canada under tariff items 220a(i) and 711.

⁽¹⁾ Transcript, Vol. 111, p. 16695

⁽²⁾ Same, Vol. 111, p. 16724

"We believe that the products of our interest are properly classified and amply described under tariff item 220a(i) with no need for classification under tariff item 711."(1)

In support of its proposal the company argued that in the absence of tariff protection many competitive products would provide a serious threat to the business already established by Canadian manufacturers.

The wax and wax-rosin emulsions are used principally as waterproofing preparations in the manufacture of paper, paperboard and building materials. Under the Brussels Nomenclature they appear to be properly classifiable under heading 38.12.

Hercules Powder is a major producer in Canada of the wax and wax-rosin emulsions under discussion. The company markets them in Canada mostly east of the Rocky Mountains; because of the relatively high cost of transportation it prefers to import on the West Coast from its parent in the United States. Although Hercules Powder is a major producer, there are apparently several other domestic manufacturers competing for the Canadian market. Imports were said to be small, originating mostly in the United States. Prices of comparable products in Canada and the United States were reported to be about the same on both sides of the border. When asked whether, in view of the similarity of prices, a level of protection lower than 20 p.c. might not be adequate, the spokesman for the company agreed that this very well could be true and observed that in general the industry certainly was not hiding behind the higher tariff.(2)

Minnesota Mining and Manufacturing of Canada Limited, of London, Ontario submitted a proposal that preparations for the treatment of leather, paper and textiles having a fluorochemical as their chief active ingredient be allowed duty-free entry until they are made in Canada and that at that time they be dutiable at 15 p.c., B.P. and 20 p.c., M.F.N. The company imports such preparations for distribution in Canada from its parent in the United States, which was reported to be the sole producer. The preparations, distributed under the trade-name "Scotchgard", are used as stain and water repellants for textiles and leather, and as oil and water repellants in the manufacture of paper and paperboard.

At present, the preparations are mostly dutiable under tariff item 904 at 15 p.c. under the B.P. and M.F.N. Tariffs, most of them appear to be classifiable under B.T.N. heading 38.12, although some are understood to be covered by headings 39.01 and 39.02.

Minnesota Mining and Manufacturing claimed to be enjoying the entire Canadian market in this field since there are no directly competitive products either Canadian-made or imported. The principal reason for its request, the company stated, was that the prices it charged included import duties and this placed its Canadian customers in leather and textile industries at a disadvantage when attempting to compete with importations from the United States of finished goods treated with fluorochemicals.(3)

(1) Transcript, Vol. 118, p. 17706-7

(2) Same, Vol. 118, p. 17718

(3) Same, Vol. 111, p. 16727

A representative of the Primary Textiles Institute, since re-named Canadian Textiles Institute, expressed support for the proposal of Minnesota Mining and Manufacturing concerning the "Scotchgard" stain repellants. According to the spokesman, the Institute was anxious "that an exception item be established under suitable wording which will enable free entry." The reason for this support, the spokesman explained, was the necessity for the Canadian mills to be able to offer fabrics competitive with those offered by textile mills in the United States.⁽¹⁾

(1) Transcript, Vol. 111, p. 16738

PICKLING PREPARATIONS FOR METAL SURFACES; FLUXES AND
 OTHER AUXILIARY PREPARATIONS FOR SOLDERING,
 BRAZING OR WELDING; SOLDERING, BRAZING OR WELDING POWDERS AND
 PASTES CONSISTING OF METAL AND OTHER MATERIALS;
 PREPARATIONS OF A KIND USED AS CORES OR COATINGS FOR
 WELDING RODS AND ELECTRODES - B.T.N. 38.13

The Products

The products covered by this part of the report are pickling preparations for metal surfaces; fluxes and other auxiliary preparations for soldering, galvanizing, brazing and welding; soldering, galvanizing, brazing or welding powders and pastes consisting of metal and other materials, and preparations used as cores or coatings for welding rods and electrodes.

This part of the report does not include preparations consisting solely of metallic powders (B.T.N. Chapter 71 and elsewhere, according to constituents) or electrodes of base metal carbides, coated or cored with a flux. (B.T.N. 83.15).

A spokesman for the Industry Committee observed that:

"Pickling preparations for metal surfaces are used for removing rust and scale from metals prior to further processing or finishing operations such as galvanizing, tinning, electroplating and painting. These preparations usually contain acids or alkalis.

"Fluxes...are substances used to facilitate the union of metals in operations by which two pieces of metal are joined together (e.g. brazing, soldering and welding) or by which one metal is coated with another (e.g. galvanizing and tinning)."(1)

One pickling preparation, inhibited muriatic acid, was brought to the Board's attention by the spokesman for Canadian Industries Limited. This is noted under Tariff Considerations below.

Galvanizing consists of applying a thin surface coating of zinc on metal, and differs from the other operations by being a coating procedure rather than a joining or sealing one. Soldering is a method of joining or sealing by the application of a coating of tin or tin and lead, usually at relatively low temperatures, on metal. There are however also hard solders which use precious metals, for example, in jewellery work. Hard solders require a higher temperature usually obtained by a flame heat. Brazing (or braze welding) is an operation similar to hard soldering, except that the metal flowed often is a brass or a bronze, and is a different metal, with a lower melting point, than the pieces of metal to be joined together. In welding, pieces of the

(1) Transcript, Vol. 111, p. 16751

same metal, for example cast iron or steel, are joined together by melting and bonding by the flowing metal. The operations are performed at high temperature, and the heat is applied by flame or electric arc.

While fluxes used for galvanizing and soldering are quite similar, they differ from the fluxes used in brazing and welding. The difference is based principally on the chemicals used, the metals to be joined and the method of application.

Galvanizing fluxes are based on ammonium chloride or zinc ammonium chloride, and soldering fluxes on zinc chloride. Galvanizing fluxes have wide applications in the sheet metal and metal fabricating trades, and the purpose of the flux is to clean, heat and dry the metal prior to dipping in a molten zinc bath. The functions of the soldering fluxes are to clean the metal by removing dirt and oxide coatings which might later weaken the bond between metal and molten solder; to form a protective film over the clean metal, and to assist the molten solder in spreading readily over the metal surface. The fluxes also protect the metal surfaces from oxidation during the application of heat.

Welding and brazing fluxes are used in gas welding, in which oxygen, acetylene, hydrogen or other gases are used for the flame heat. The fluxes are mixtures of various chemicals and metals which, during welding and brazing, remove oxide and impurities and float them to the surface so that they are removed from the weld zone.

Galvanizing and soldering fluxes are, therefore, very similar, but these two types are different from welding and brazing fluxes. Fluxes are usually sold by trade names.

Raw Materials and the Process of Manufacturing

Pickling preparations are either based on dilute acids (hydrochloric, sulphuric, hydrofluoric, nitric, phosphoric, etc.), or based on alkalies (e.g. sodium hydroxide). Sometimes certain inhibitors are mixed with these preparations to restrict the corrosion of the metal.

The principal raw materials used for fluxes are ammonium chloride, zinc chloride, sodium tetraborate, rosin, lanolin and mixtures of aluminum granules or powder with metallic oxides (e.g., iron oxide). The metallic mixtures are used to generate the intense heat required in welding operations.⁽¹⁾ When zinc ammonium chloride is used directly as a galvanizing flux, without admixture, it was reported to be in a different form than that used for other purposes; the crystals are larger.⁽²⁾

The principal chemicals used in the manufacture of fluxes are made in Canada and about one half of the additives were said to be produced in Canada and the rest imported. It was stated in the public hearing by the spokesman for C.I.L. that:

(1) Explanatory Notes to the Brussels Tariff Nomenclature, 1955, Vol. 1, p. 362

(2) Transcript, Vol. 111, p. 16761

"There are certain additives which we add to the different fluxes which are present in very small quantities, and it is very difficult to say just what quantities may be made in Canada. I would estimate that it might be 50 per cent which could be obtainable in Canada, and 50 per cent would not be."⁽¹⁾

Some zinc ammonium chloride also was said to be imported for use as a flux or in the manufacture of fluxes; it is a somewhat different form of product than that of Canadian manufacture, but the spokesman for C.I.L. did not regard the difference as significant. However, even though the cost of the imported material was somewhat higher than the Canadian, some users continued to import it.

The process of manufacture of these fluxes is quite simple. It involves compounding the components under carefully controlled conditions to obtain uniform dispersion. The fluxes are packed in cans or jars for shipment to the users.⁽²⁾

The Explanatory Notes to the Brussels Tariff Nomenclature also refer to soldering, brazing or welding powders and pastes under this heading. The essential constituent is metal, but they contain other constituents as well. The preparations are classified by this B.T.N. heading only when they are in the form of powders or pastes containing other constituents as well as metals.

The Industry

Although a number of companies are producing fluxes in Canada, the two companies which submitted briefs were Canadian Industries Limited (C.I.L.) and Union Carbide Canada Limited. C.I.L., at Hamilton, Ontario, is the sole producer in Canada of ammonium chloride and zinc ammonium chloride, and manufactures a range of fluxes from these. All galvanizing fluxes of commercial importance in Canada were said to be based on ammonium chloride or zinc ammonium chloride; other companies produced such fluxes, some from imported zinc ammonium chloride. The company produces a wide range of galvanizing fluxes and of soldering fluxes; the chief raw material for the soldering fluxes is zinc chloride which also is made by C.I.L. at the Hamilton plant.

Union Carbide Canada Ltd. (Linde Gases Division) produces welding and brazing fluxes at plants across Canada. The company, however, does not produce a complete range of these fluxes. It confined its interest to those fluxes for use in flame welding by such gases as oxygen, acetylene and hydrogen; it expressed no interest, at the time, in those for electric arc welding. The company's products are for cast iron welding and bronze welding. A number of small volume, specialty types of welding and brazing fluxes are imported because they are not made in Canada. The cast iron and bronze welding fluxes were said to represent 80 or 90 per cent of all fluxes used for gas welding in Canada. About 80 per cent of the market was thought to be held by Canadian manufacturers.

⁽¹⁾ Transcript, Vol. 111, p. 16768

⁽²⁾ Same, Vol. 111, p. 16775

In addition to the two companies mentioned above, other companies said to be manufacturing fluxes in Canada are, the Aluminum Company of Canada Limited, Canadian Liquid Air Company Limited and Airco Products Limited.⁽¹⁾

Data on the manufacture, shipment, materials used and sale of fluxes in Canada are not available in detail.

The Canadian Market

In view of the wide and varied uses of fluxes in sheet metal, metal fabricating and welding, it is difficult to assess the size of the overall market, as was noted by the spokesman for C.I.L.

"Galvanizing fluxes find wide application in the sheet metal and metal fabricating trades. Their importance in the cost structure in the industry is relatively minor. The overall size of the market is not readily assessable."⁽²⁾

On soldering fluxes he stated:

"Owing to the great diversity of applications, many different mixtures are used as soldering fluxes, and the scope of the market is not readily assessable. They are, however, a very minor item in the cost structure of the metal fabricating trades where they are used."⁽³⁾

In the case of the galvanizing fluxes, it was further stated in the public hearing that 75 per cent of the Canadian market was met by C.I.L. and about 25 per cent imported; for soldering fluxes, the company was uncertain of the portion of the market served by imports.

For welding and brazing fluxes almost all the Canadian market was said to be supplied from Canadian sources, and the imported fluxes constituted those of relatively small usage and for special purposes.

In regard to the overall market, the statements at the public hearing would suggest that possibly some 75 to 85 per cent of the market is held by Canadian manufacturers. Based on this distribution, and the apparent level of imports, the market for fluxes in Canada would appear to be of the order of possibly one or two million dollars a year.

The regional pattern of the market for fluxes is influenced by the concentration of industry in different regions. Ontario and Quebec having relatively more metal fabricating industry consume most of these products. The spokesman for Union Carbide stated in this connection in the public hearing that:

"The heavy areas of use naturally would be Ontario and Quebec, where we have the concentration of industry. More of these products would be used in Ontario and Quebec than in the other provinces."⁽⁴⁾

(1) Transcript, Vol. 111, p. 16781

(2) Same, Vol. 111, p. 16755

(3) Same, Vol. 111, p. 16756

(4) Same, Vol. 111, p. 16783

Foreign Trade

Imports of fluxes were stated to be approximately evenly divided between the U.S.A. and the U.K. as sources of supply. For the available data, however the country of origin is reported only up until 1960 and, to that time, only the U.S.A. was shown as a country of origin. Imports of fluxes for brazing, soldering and welding, together with other welding compounds, for the last nine years were reported as follows.

Year	Imports of fluxes, brazing soldering and welding \$'000	Imports of welding compounds \$'000	Total imports \$'000
1956	175	270	445
1957	300	380	680
1958	250	330	580
1959	250	310	560
1960	270	350	620
1961	440	195	635
1962	640	..(a)	640
1963	745	..(a)	745
1964(b)	..	..	..

(a) Included in first column

(b) In 1964, imports of fluxes are included in s.c. 429-52 under the general description "metal working compounds prepared."

Source: Chemical Import Trends, Department of Industry, s.c. 8415

Imports of these fluxes and welding compounds rose from \$445,000 in 1956 to \$745,000 in 1963, but it is not known what portion of these imports consists of products under this heading or is competitive with Canadian-made products here under consideration. As stated earlier, imports include fluxes of relatively small usage and specialty products.

No exports were reported.

Prices

Published data on the prices of fluxes are not readily available, but it was mentioned in the public hearing that:

"Some fluxes might be 50 cents a pound; others, speaking specifically of Canadian made fluxes, could be a dollar and a half to \$2.00 a pound."⁽¹⁾

The prices vary depending upon type, quantity, packaging and the market in which they are sold. Prices of fluxes in Canada were said to be generally comparable to those in the U.S.A.

(1) Transcript, Vol. 111, p. 16785

Tariff Considerations

At present the imports of these fluxes are made principally under the following tariff items:

<u>Tariff Item</u>	<u>British Preferential</u>	<u>Most Favoured Nation</u>
220a	Chemical preparations, compounded of more than one substance, n.o.p.:- (i) When dry, or liquid containing not more than two and one-half per centum of proof spirit	15 p.c. 20 p.c.
711	All goods not elsewhere enumerated	15 p.c. 20 p.c.

The Industry Committee and the companies submitting briefs requested that the fluxes covered by the above items be classified according to an item like B.T.N. heading 38.13.

"This heading covers:

"(1) Pickling preparations for metal surfaces. These are preparations used to remove oxides, scale, rust or tarnish from the surface of metals, or for roughening these surfaces to facilitate certain operations. The pickling process may be a finishing operation, or may be effected at an earlier stage (to prepare the metal for drawing or extruding operations, for example), or prior to coating the metal, e.g., by galvanising, metallising, tinning, cladding, electro-plating, painting, etc.

Pickling preparations are usually based on dilute acids (Hydrochloric, sulphuric, hydrofluoric, nitric, phosphoric, etc.), and sometimes contain inhibitors which restrict the corrosion of the metal. Some, however, have a basis of alkalis (e.g., sodium hydroxide).

"(2) Fluxes and other auxiliary preparations for soldering, brazing or welding. Fluxes are used to facilitate the joining of the metals in the process of soldering, brazing or welding, by protecting the metal surfaces to be joined and the solder itself from oxidation. They have the property of dissolving the oxide which forms during the operation. Zinc chloride, ammonium chloride, sodium tetraborate, rosin and lanolin are the products most commonly used in these preparations. This group also includes mixtures of aluminium granules or powder with various metallic oxides (e.g., iron oxide) used as intense heat-generators (alumino-thermy process) in welding operations, etc.

"(3) Soldering, brazing or welding powders and pastes consisting of metal and other materials. These preparations are used to make the metal surfaces to be joined adhere to each other. Their essential constituent is metal (usually alloys containing tin, lead, copper, etc.). These preparations are classified in the present heading only when:

- (i) They contain other constituents as well as metals. These constituents are the auxiliary preparations described in (2) above; and
- (ii) They are put up in the form of powders or pastes.

Soldering, brazing or welding preparations consisting solely of metallic powders, whether or not mixed together, are excluded (Chapter 71 or Section XV according to their constituents).

"(4) Preparations of a kind used as cores or coatings for welding rods and electrodes. These are mainly intended to eliminate, in the form of fusible slag, the oxides which form during welding operations. They usually consist of a refractory mixture containing, for example, lime and kaolin.

Electrodes, of base metal or of metal carbides, coated or cored with a flux, are excluded (heading 83.15)."(1)

Canadian Industries Limited stated its proposal in the following manner.

"The company respectfully proposes that rates of B.P. 15 per cent and M.F.N. 20 per cent continue to apply on galvanizing fluxes as defined under Brussels Chapter 38.13.

"The company respectfully proposes that the rates B.P. 15 per cent, M.F.N. 20 per cent recommended for Brussels Heading 38.13 should apply to soldering fluxes."(2)

The company also proposed these rates for zinc ammonium chloride and zinc chloride under B.T.N. heading 28.30; these compounds are at times used directly as galvanizing and soldering fluxes respectively.

Regarding welding, brazing and soldering fluxes, Union Carbide of Canada Limited requested "the continuance of the present rates of duty on welding, brazing and soldering fluxes. These are 15 per cent B.P. and 20 per cent M.F.N."(3)

(1) Explanatory Notes to the Brussels Tariff Nomenclature, 1955, Vol. 1, p. 362-3

(2) Transcript, Vol. 111, p. 16755, 16757

(3) Same, Vol. 111, p. 16775

The main arguments presented by the companies in favour of the continuation of the present rates of duty on the import of fluxes were:

- (a) That while the present rates of duty of 15 p.c., B.P. and 20 p.c., M.F.N. have helped the Canadian manufacturer to supply the Canadian market, there is no evidence that these rates constituted a burden on the consumer or the economy.
- (b) About 80 per cent of most of the types of fluxes referred to by the companies in their submission are made in Canada.
- (c) The use of fluxes constitute a very minor item in the cost structure of the sheet metal and metal fabricating trades.

In regard to the importation of the various fluxes and the duties levied on them, the spokesman for Union Carbide of Canada Ltd. stated:

"At the present time, most fluxes enter Canada under Tariff Item 711 at 15 per cent B.P. and 20 per cent M.F.N. (Some fluxes such as Chromaloy and cast iron brazing fluxes are imported from the U.S. under Tariff Item 220a(i) at 15 per cent B.P. and 20 per cent M.F.N."(1)

It would thus appear that the companies were proposing, in the main, continuation of the existing levels of protection under the British Preferential and Most Favoured Nation Tariffs; rates of 15 p.c., B.P., 20 p.c., M.F.N. apply both under item 711 and 220a(i), the existing tariff items that apply to most imports. The companies did not elaborate on the extent to which these rates had been a factor in securing most of the Canadian market for domestic manufacturers. However, if prices of comparable products are at approximately the same level in Canada as in the U.S.A., Canadian producers apparently are not taking full advantage of this protection in their pricing policy. No evidence was adduced to indicate under what disadvantages producers in Canada were operating to require a continuation of these rates of duty.

Although one of the spokesmen expressed the view that (at the time of the hearing) imports from the United Kingdom were about as great as those from the U.S.A., the published data do not record this information. No particular emphasis was placed on the need for a rate of duty of 15 p.c. under the British Preferential Tariff.

The spokesman for C.I.L. also drew attention to inhibited muriatic acid, used as a pickling preparation and classified by B.T.N. heading 38.13. At the hearing of January 22, 1963 when products of B.T.N. heading 38.19 were before the Board, the company noted that inhibited muriatic acid is muriatic acid to which an inhibitor has been added to prevent reaction on the metal. C.I.L. manufactures this pickling preparation at Hamilton, Ontario and reported that it was unaware of imports of the product.

Inhibited muriatic acid is dutiable under tariff item 220a(i) at rates of 15 p.c., B.P., 20 p.c., M.F.N., and C.I.L. proposed that these rates should continue to apply. The company did not indicate why these rates were necessary, though attention was drawn to the rates of duty on muriatic acid. The acid was said to account for possibly 50 per cent of the total cost of production.⁽¹⁾ Muriatic (hydrochloric) acid is dutiable under tariff item 217a, when in packages weighing not more than 100 pounds, Free, B.P. and at 22½ cents per 100 pounds under the M.F.N. Tariff. It is otherwise dutiable under tariff item 217 of 17½ cents, B.P., 22½ cents, M.F.N. per one hundred pounds, the equivalent under the M.F.N. Tariff of 15 p.c. ad valorem, based on a price of \$30 a ton in the U.S.A. Muriatic acid is discussed under B.T.N. heading 28.06. The company did not indicate that it imported any muriatic acid for the manufacture of the pickling agent.

No other manufacturer in Canada of inhibited muriatic acid came to the attention of the Board, though C.I.L. and Dow Chemical of Canada expressed the view that some other companies likely were purchasing muriatic acid and adding inhibitors. Other pickling agents were said to be available.

No representations were made for products of the heading other than the fluxes. The Industry Committee proposed that rates of 15 p.c., B.P., 20 p.c., M.F.N. should apply residually to any products of the heading not covered by the other submissions.

(1) Transcript, Vol. 116, p. 17529

ANTI-KNOCK PREPARATIONS, OXIDATION INHIBITORS, GUM INHIBITORS,
VISCOSITY IMPROVERS, ANTI-CORROSIVE PREPARATIONS AND SIMILAR
PREPARED ADDITIVES FOR MINERAL OILS - B.T.N. 38.14

This heading applies to mineral oil additives whose function is to improve the storage or performance qualities of lubricants or fuels. Preparations which are themselves lubricants or fuels are excluded from the heading, as are chemically defined elements or compounds. The term mineral oil includes gasoline, fuel oil, lubricating oil and grease derived from crude oil.

The Explanatory Notes to the Brussels Nomenclature deal with prepared additives in two parts. The first refers to prepared lubricating additives for heavy mineral oils to improve their lubricating or other properties; to prevent oxidation; to protect the machines on which they are used from corrosion; to remove the gum, carbon deposits, etc., formed during the running of machines and to prevent the formation of foam. The second refers to prepared additives for light mineral oils, the most important of which are anti-knock preparations to improve the ignition of motor fuels. Other additives for light fuel oils inhibit the formation of gum during storage and remove engine deposits.⁽¹⁾

Although the employment of additives in mineral oils dates from the nineteenth century, the growth of this industry is closely associated with the development of the automotive industry and the great increase in use of high-performance machinery generally. Apart from anti-knock compounds, which constituted approximately 60 per cent of the value of consumption of finished additives in Canada in 1963, by far the most important other products classified to this heading are lubricating additives; additives for heating oils also have risen considerably in importance as the use of this fuel has increased and its performance improved. Relatively minor quantities of gasoline antioxidants, heating oil pour depressants, fuel oil detergents and sludge dispersants are also included.⁽²⁾

Although complete data are not available, it would seem, as the following table indicates, that the market in Canada for these additives is of the order of \$30 million a year, of which perhaps 60 per cent represents production in Canada. Production in Canada, for the most part, tends to be segregated into those firms which produce primarily anti-knock compounds for gasoline and those which produce additives for lubricating oils and fuel oils.

One significant feature of the production of these products in Canada is that it can be considered in three stages, and some of the companies were careful to draw attention to the need to keep in mind the distinctions from one stage to another. Lubrizol of Canada Limited, for example, drew a distinction between three levels of manufacture of lubricating oil additives — the basic raw material used in the manufacture of components for additives, the components themselves and the finished additives. Typical raw materials used in the manu-

(1) Explanatory Notes to the Brussels Nomenclature, Vol. I, p. 363

(2) Transcript, Vol. 112, p. 16963

The Canadian Mineral Oil Additive Market, 1959-64

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<u>Year</u>	<u>Imported Gasoline Anti- oxidants</u>	<u>Other (a) Imports</u>	<u>Total Imports</u>	<u>Anti-knock Consumption</u>	<u>Anti-knock Production (5) - (2)</u>	<u>Lubricant Additive Production (b)</u>	<u>Total (6) + (7) (c)</u>	<u>Total Consumption of Finished Additives (4) + (8)</u>
		- t h o u s a n d s o f d o l l a r s -						
1959	364	6,970	9,757	15,347	12,924	2,000	14,924	24,681
1960	316	8,695	11,481	15,161	12,691	2,000	14,691	26,172
1961	390	8,195	10,920	16,360	14,025	2,000	16,025	26,945
1962	353	9,430	12,654	17,982	15,111	2,250	17,361	30,015
1963	388	9,465	12,830	18,310	15,333	2,500	17,833	30,663
1964	325	9,114	12,793	..	..	..	..	..

(a) Primarily lubricant additive components

(b) Estimated value added in blending imported lubricant additive components

(c) Excludes small amounts of additives other than anti-knock and lubricant additives

Source: Chemical Import Trends, Trade of Canada, U.S. Export Report No. F.T. 410, D.B.S. Cat. No. 45-205 and Transcript, Vol. 113, p. 17033

facture of lubricant additive components are phosphorous pentasulphide, barium oxide, sulphuric acid, alkyl phenol, alcohols, detergent alkylates, chlorinated wax and petroleum oils as solvents. Common components for lubricating oil additives are shown in Appendix II. On occasion, an additive component can also function as a finished additive, but finished additives usually are a combination of additive components. As an example, a heavy duty motor oil for use in an automobile may contain a finished additive composed of an oxidation inhibitor, a corrosion preventive, a detergent and a viscosity index improver.

Because there are significant differences in the market for the various additives and in their production, they are here considered in the following sections:

- (1) Anti-knock preparations
- (2) Lubricant oil additives
- (3) Other fuel and grease additives

Anti-Knock Preparations

Anti-knock preparations are gasoline additives whose function is to control the rate of combustion of gasoline in the combustion chamber; too rapid a rate is likely to occur because of the high compression ratios, pressures and temperatures associated with the modern gasoline engine.

There are three types of anti-knock preparations of which only one, using tetraethyl lead compounds, was manufactured in Canada at the time of the hearing in 1962. However, Ethyl Corporation of Canada Ltd., the sole Canadian producer of tetraethyl lead preparations, announced in 1965 that facilities for the production of tetramethyl lead and mixed lead alkyl preparations were nearing completion at Sarnia. In addition, Du Pont of Canada Ltd. announced plans for the construction of a plant at Maitland, Ontario. It was reported that, by mid-February 1966, the plant would produce a full range of gasoline anti-knock compounds and that annual capacity would be greater than 25 million pounds.⁽¹⁾

In speaking of the substitutability of the different anti-knock compounds, a spokesman for Ethyl Corporation stated that:

"The practice of substitution would probably occur only on good reason. This reason would be related to the difference in characteristics of one versus the other, and as that proved effective or more effective in a specific gasoline. These three classes of anti-knock compounds do have different characteristics. Tetramethyl lead, for instance, has a higher volatility. The mixed lead alkyls tend to combine the characteristics of tetraethyl lead and tetramethyl lead. The only way that a user of these materials could decide in his mind as to which one is best for his particular use would be for him to run tests, engine tests, to see what results he would get."⁽²⁾

⁽¹⁾ Canadian Chemical Processing, January, 1966

⁽²⁾ Transcript, Vol. 113, p. 17048

Anti-knock preparations based on tetraethyl lead are the only ones at present made in Canada, although, as noted above, two companies have announced plans to make other preparations. Tetraethyl lead is produced, basically, from lead, sodium and ethyl chloride; it is discussed under heading 29.34. The tetraethyl lead is blended with ethylene dibromide and, at times, ethylene dichloride to make the anti-knock preparations. Of the basic materials, only ethylene dibromide and sodium are not available from Canadian production. Thus, unlike the situation noted for the lubricant additives, the import content of the anti-knock preparations is relatively small.

There are two types of tetraethyl lead anti-knock compounds produced, one for motor gasoline and one for aviation gasoline. The formulations differ to the extent that the former includes ethylene dichloride, ethylene dibromide and tetraethyl lead while the latter excludes ethylene dichloride. However, because jet engines do not require this additive, the aviation industry is no longer the important consumer it once was.

Because Ethyl Corporation was the sole Canadian producer of tetraethyl lead anti-knock preparations, the Canadian market for this product was supplied by that firm's output and by imports. There are no known exports. The market for anti-knock preparations in Canada appears to be approaching \$20 million a year, of which, in the past, about 80 per cent has been supplied from Canadian production. What the effect will be on imports and on Canadian production when the new production facilities are in operation cannot be assessed but presumably the share of imports in the market will decline or be partly offset by exports.

Imports of anti-knock compounds have risen from about \$2.4 million in 1959 to about \$3.4 million in 1964. One company, Standard Oil Company of British Columbia, Limited, stated that it imported the tetramethyl lead-based preparations. Imperial Oil Limited uses tetraethyl lead preparations purchased from the Canadian manufacturer in all of its refineries except the one at Montreal where it uses tetraethyl lead anti-knock preparations imported from the U.S.A. Du Pont of Canada Limited also is reported to have been importing the preparations prior to establishing manufacturing facilities in Canada.

While its statement was not confined to anti-knock preparations, the British American Oil Company Limited noted that it purchases finished additive requirements in amounts of several million dollars per year; "a major portion" is purchased from Canadian manufacturers but a number of materials required are not available in Canada and must be imported.⁽¹⁾

Prices in Canada are not published either for anti-knock preparations or for tetraethyl lead, the principal material. However, trade sources show the U.S. price of tetraethyl lead in August 1964, on a total motor-mix basis, as 34.7 cents per pound; the price of tetramethyl lead, total motor-mix basis, was 43.0 cents per pound.⁽²⁾ On the same basis, the price of TEL-TML mixed lead alkyl preparations was shown as 39.3 cents per pound. On the basis of the contained

(1) Transcript, Vol. 113, p. 17003

(2) Oil, Paint and Drug Reporter, August 3, 1964, p. 9

alkyl, the price of the tetramethyl lead was 84.6 cents per pound; the price of the contained alkyl in the TEL-TML mix was 70 cents per pound. No price was given for the contained tetraethyl lead. However Ethyl Corporation of Canada submitted average sales prices of tetraethyl lead anti-knock preparations in Canada, based on contained tetraethyl lead, as shown in the following table. The average value of exports of anti-knock compounds from the U.S.A. to Canada has been about 35 cents a pound in recent years, consistent with the published U.S. price, as noted above of 34.7 cents a pound. Imperial Oil said that the price it paid for the Canadian product was competitive with that paid for its imports from the U.S.A. Ethyl Corporation of Canada drew attention to the declining price of anti-knock preparations which it associated with increasing world capacity and new entrants into the production of these products.

Anti-knock Preparations, Average Sales Price of Contained TEL,
1957-62

<u>Year</u>	<u>\$/lb.</u>	<u>Year</u>	<u>\$/lb.</u>
1957	.613	1960	.589
1958	.606	1961	.589
1959	.602	1962	.580

Source: Transcript, Vol. 113, p. 17042

Ethyl Corporation of Canada expressed concern about growing world-wide capacity to produce anti-knock preparations and prices which it said were falling as a result not of improved production techniques or cost savings, but rather of competition from over-capacity. These low prices had not resulted in imports into Canada from European or Asian countries, and the company explained this in the following terms:

- 1) The "Buy Canadian" practices of Canadian consumers;
- 2) The practice by foreign producers of using drums for shipment, instead of bulk containers, resulting in inconvenience and extra cost to some Canadian consumers;
- 3) Price reductions in Canada;
- 4) Technical services provided by the Canadian producer.

Tariff Considerations

The following tariff items in the Canadian Customs Tariff are most relevant to anti-knock preparations and their principal materials. Tariff item 220a, listed below, applies to preparations using mixed lead alkyls.

Tariff Item	Description of Goods	Rates of Duty	
		B.P.	M.F.N.
220a	Chemical preparations, compounded of more than one substance, n.o.p.:— (i) When dry, or liquid containing not more than two and one half per centum of proof spirit	15 p.c.	20 p.c.
263	Compounds of tetraethyl lead, in which tetraethyl lead is the preponderant constituent by weight	Free	5 p.c.
263e	Compounds of tetramethyl lead, in which tetramethyl lead is the preponderant constituent by weight	12½ p.c.	12½ p.c.

In addition to the above items referring to the preparations, tariff item 263d provides duty-free entry for ethylene dibromide and sodium, the principal imported materials. These materials are discussed under headings 29.02 and 28.05 respectively.

Apart from submissions of a general nature which supported the adoption of an item like B.T.N. heading 38.14 for classification of goods and which are noted below in the tariff considerations for the other products of this heading, there were three submissions under heading 38.14 that dealt specifically with anti-knock preparations. These were by Ethyl Corporation of Canada Limited, Imperial Oil Limited and Standard Oil Company of British Columbia Limited. In addition, the more general submission by British American Oil Limited, dealt with in the subsequent section, expressed vigorous opposition to tariffs on products not produced in Canada.

Ethyl Corporation of Canada Limited proposed that a sub-group be established in B.T.N. heading 38.14 as follows:

"(a) Anti-knock compounds of lead alkyls 5 - 10 - 25 per cent"(1)

If such an item were incorporated into the Tariff it would have the effect of bringing into one tariff item the preparations made from tetraethyl lead (TEL), from tetramethyl lead (TML) and from mixed lead alkyls. These are all anti-knock preparations for blending into gasoline, although at the time of the hearing the mixed lead alkyls were not used in Canada.

Rates of duty applying to imports of TEL, TML and mixed lead alkyls are, respectively, Free, B.P., 5 p.c., M.F.N.; 12½ p.c. under both Tariffs and 15 p.c., B.P., 20 p.c., M.F.N. The proposed item would make them all dutiable at rates of 5 p.c., B.P. and 10 p.c., M.F.N. While the proposed item would reduce certain rates of duty, it would have the effect of doubling the M.F.N. rate for anti-knock preparations based on tetraethyl lead, the rate that applies to most imports into Canada.

Imperial Oil submitted a brief on the subject of tetraethyl lead anti-knock preparations; all of the company's requirements are purchased in Canada with the exception of those for its Montreal refinery, which are imported from the U.S.A. The company's proposal for tetraethyl lead preparations was in opposition to the proposed increase in the M.F.N. rate of duty by Ethyl Corporation of Canada Limited. In opposing this increase, Imperial Oil noted that the tariff should not permit undue increases in the cost of materials to an established Canadian manufacturer, and that "constant vigilance is necessary to ensure that duty protection does not encourage uneconomic manufacture or undue profits."⁽¹⁾

The Standard Oil Company of British Columbia Limited proposed that tariff item 263e, which deals with compounds of tetramethyl lead, be deleted and that its provisions be incorporated in tariff item 263, which would then read:

"Compounds of tetraethyl lead, in which tetraethyl lead is the preponderant constituent by weight, and compounds of tetramethyl lead, in which tetramethyl lead is the preponderant constituent by weight."⁽²⁾

By this proposal, the rates of duty applicable to compounds of tetramethyl lead would be reduced from 12½ p.c. to Free, B.P., 5 p.c., M.F.N.

In effect, therefore, Imperial Oil Limited was seeking no increase in the rate of duty most applicable to its operation; Standard Oil of British Columbia was seeking a reduction in the rate applicable to its operation and Ethyl Corporation, while proposing some reductions in rates, was seeking an increase in the predominant rate. It justified its proposal in the following words:

"Ethyl Corporation of Canada is basically opposed to high tariff walls, which may lead to abuse, but it strongly supports reasonable tariff protection to assist an essential Canadian industry to remain in a competitive position without forcing unjustifiably high costs upon the petroleum industry."⁽³⁾

The company noted the increasing number of plants throughout the world for producing anti-knock compounds and expressed the fear that "this actual and prospective entry of new producers has brought about a declining and somewhat chaotic price structure which could, if brought into Canada, severely damage this company's position."⁽⁴⁾

Although at the time of the hearing there were no imports from countries other than the U.S.A., Ethyl Corporation said that imports from other countries constitute a definite threat. The company requested a slight increase in the tariff to protect the industry against declining prices which are not "effected by improvements or

(1) Transcript, Vol. 113, p. 17080

(2) Same, Vol. 113, p. 17035

(3) Same, Vol. 113, p. 17041

(4) Same, Vol. 113, p. 17043

savings in costs, but are really because of a critical competition position which is just forcing these prices down well below what is considered reasonable."⁽¹⁾

The main reason for the other two companies to take a different view is apparent from the nature of their operations. Both are to some extent users of imported material; in the past there has been no Canadian source of supply of the tetramethyl lead used by Standard Oil of British Columbia and only one domestic supplier of the tetraethyl lead compounds used by Imperial Oil Limited. The British American Oil Company Limited, as noted in the later section, was opposed to rates of duty on products not made in Canada.

Additives For Lubricating Oils

Prepared additives for lubricating oils are produced in Canada by Imperial Oil Limited, at Sarnia, Ontario, and Edmonton, Alberta; Lubrizol of Canada Limited at Sarnia, Ontario, and by Monsanto Canada Limited at Montreal, Quebec. In addition, Texaco Canada Limited was said to make finished additives for its own use. The additives made by these companies are primarily blends of components which are imported, mostly from the United States.

In describing the function of finished additives, a spokesman for Lubrizol of Canada Ltd. stated:

"Briefly, additives are essential in the manufacture of lubricants capable of satisfactory performance in modern internal combustion engines, in rear axles and automatic transmissions of all modern automotive equipment and in other machinery operating under conditions of high speed, extreme high or low temperatures, and where extreme pressure is exerted on bearing or gear surfaces."⁽²⁾

Imperial Oil Limited noted that oil additives represent a wide variety of specialty products and are high in value, averaging about \$2.50 per gallon. The value of the additive content of premium quality motor oils can represent as much as half of its manufactured cost.

Monsanto Canada Ltd. described the nature of the lubricating additive industry in the following terms:

"lubricating oil additives are formulated to meet the requirements of the individual application. These requirements are usually described by means of a specification which sets out the physical properties, such as viscosity, flash point and corrosion limitations of the lubricant, and also the performance properties, such as the degree of carbon formation, lacquering, and sludge formation in the case of a crankcase oil. The specifications are usually drawn by the equipment manufacturer with heavy reliance of specifications developed by the military.

(1) Transcript, Vol. 113, p. 17059

(2) Same, Vol. 112, p. 16831

"The measurement of physical properties is carried out in laboratories equipped with a number of pieces of apparatus suitable for these measurements, which are by and large, relatively simple and inexpensive. The measurement of performance properties however is another matter. Here measurements must be made in test engines under simulated conditions of exposure over extended periods of time. The equipment is expensive and the tests time consuming. An engine test of a single formulation of crankcase lubricant plus additives, for example, may cost \$5,000.00 to \$10,000.00. Several such tests may be required to select the best combination of components to obtain the best lubricant for a single application. This particular formulation may be restricted to one petroleum base stock as produced by one petroleum refinery with similar tests having to be duplicated with a different base stock of another refiner to provide him a finished lubricant competitive in quality with the first. In Canada, the only test-engine installations for performance testing are at the National Research Council, Ottawa, and The British American Oil Company."(1)

The production of lubricant additives in Canada is not very great, though it is an increasing share of total requirements particularly as more Canadian components become available. Most of the present production consists of blending imported components to produce finished additives. This situation was described by a spokesman for Imperial Oil Limited in the following way. "To the best of our knowledge, most of these operations are based upon importing specialized additive intermediates not made in Canada and completing the processing to finished prepared additives."(2)

At the public hearing, a spokesman for Texaco Canada Limited estimated that Canadian production was supplying about one-fifth of total requirements of lubricant additives. This, in the preceding market table, is reflected in the estimated value added in Canada in 1961-63 of about \$2.25 million a year, on average, out of an apparent market for lubricant additives of \$10 million to \$12 million.

The four companies that expressed an interest in these additives did so from somewhat different points of view.

At the time of the hearing, Imperial Oil Limited was interested in lubricant oil additives both as a producer and as a consumer and as a potential producer of certain of the additive components. The company imported and blended components primarily for its own use but it reported plans for a fully-integrated lubricating oil additive plant to be built at Sarnia, Ontario. The details of this operation, however, are not known.

Lubrizol is engaged in the manufacture of a wide range of prepared lubricant additives for the petroleum industry. In 1962, it produced sixty-two different finished additives from forty-eight imported and ten domestically produced additive components; six of the

(1) Transcript, Vol. 112, p. 16915

(2) Same, Vol. 112, p. 16966

components were manufactured by the company itself. Lubrizol contemplated the manufacture of sixteen components by 1963. The company commented on this in the following manner:

"In terms of volume per cent of domestic materials utilized in the manufacture of additives by Lubrizol of Canada, in 1961, this amounted to approximately 10 per cent. In 1962, the amount was 23 per cent. Estimated for 1963, which would be the first full year of production for certain of the components, the percentage would be approximately 48 per cent. If contemplated equipment acquisitions are carried out in 1963, this percentage is estimated to be 67 per cent."(1)

Monsanto produces a wide range of finished additives and additive components, and purchases its other requirements of additive components domestically, if possible, but otherwise from abroad. The company said that prices of Canadian finished additives are typically from 3 to 11 per cent higher than comparable U.S. prices.

Texaco Canada Limited blends additive components for its own use.(2)

The competitive nature of the additive industry was said to make secrecy with respect to the exact composition of the chemical substances imperative.

The tariff considerations relevant to additives for lubricant additives are given below, following the note on other fuel and grease additives.

Other Fuel and Grease Additives

Both Imperial Oil and Monsanto reported that the market for these products was small in relation to the total additive market. The only public statistics relate to importations of gasoline antioxidants and liquid gum inhibitors. Imports of gasoline antioxidants have been valued at less than \$400,000 in recent years. U.S. export data show exports to Canada of liquid gum inhibitors for treating petroleum distillates valued at approximately U.S. \$225,000 in 1964; these imports have been declining through the years, having been \$434,000 in 1959.

Canadian Aniline & Extract Co. Ltd., a subsidiary of Nopco Chemical Canada Limited, is a manufacturer of antioxidants, and most of its production is for use in gasoline. In addition, the company makes limited quantities of anticorrosive chemicals, stabilizers, gum inhibitors and viscosity improvers for petroleum products. Its products may be grouped as follows:

- 1) gasoline antioxidants
- 2) anticorrosive chemicals and stabilizers for fuels, and
- 3) metal deactivators for gasoline, fuel oils and like petroleum products.

(1) Transcript, Vol. 112, p. 16836

(2) Same, Vol. 113, p. 17030

The company reported that it has a substantial portion of the anti-oxidant market and a smaller part of the market for the remaining products.⁽¹⁾ The antioxidant of primary concern to the company, ditertiary butyl para cresol, is a defined chemical dealt with under B.T.N. heading 29.06.

Monsanto Canada Ltd. is a producer of fuel oil additives used to prevent sludge and rust formation during storage and is a potential producer of corrosion inhibitors for use in pipeline transportation of petroleum products.

Tariff Considerations

Most of the products of interest with respect to additives for lubricating, heating and fuel oils may be imported principally under the following tariff items:

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
220a Chemical preparations, compounded of more than one substance, n.o.p.:— (i) When dry, or liquid containing not more than two and one half per centum of proof spirit	15 p.c.	20 p.c.
220c Gasoline anti-oxidents for use in the production of gasoline.....	15 p.c.	20 p.c.
220e Materials, of a class or kind not made in Canada, for use in the manu- facture of additives for heating, lubricating and fuel oils.....	Free	5 p.c.
901(c) Synthetic resins in organic solvents where the solvent is not more than 60 per cent by weight, without other admixture; 5. Other type	10 p.c.	10 p.c.
904 Synthetic resin compositions, n.o.p.	15 p.c.	15 p.c.

Some goods may be entered under tariff item 711 at rates of 15 p.c., B.P., 20 p.c., M.F.N.

Lubrizol of Canada, Limited proposed that prepared additives for heating, lubricating and fuel oils continue to be dutiable as under tariff item 711 at rates of 15 p.c., B.P., 20 p.c., M.F.N. The company also proposed that materials to be used in the manufacture of additives, when not made in Canada, continue to be dutiable under tariff item 220e at rates of Free, B.P., 5 p.c., M.F.N.; the company proposed that item 220e be made permanent, rather than be a temporary item as at present.

⁽¹⁾ Transcript, Vol. 111, p. 16806

In elaboration of this proposal, the spokesman for Lubrizol said:

"It is apparent from the brief that we are making a submission that the present level of additives and the present structure of duties for additives and for components should remain. We make that submission whether it is accepted in terms of the present structure, or, alternatively, whether it is within the structure of the Brussels Nomenclature. In either case we ask that the prepared additives for mineral oils be B.P. 15 and M.F.N. 20 per cent, and that materials to be used in the preparation of additives for mineral oils when not made in Canada be free and 5 per cent; when made in Canada, 15 and 20 per cent."⁽¹⁾

The company argued that there is no justification for tariff protection on additive components that cannot be economically manufactured in Canada due to the small size of the market. "In the case of the larger volume components, tariff protection would be justified only on the basis that their components were manufactured in Canada."⁽²⁾

Although Lubrizol's primary concern was with rates, it was dissatisfied with the Brussels wording. With respect to B.T.N. heading 38.14, Lubrizol of Canada proposed a rewording as follows:

"38.14 Prepared additives for mineral oils.
 B.P. 15 per cent M.F.N. 20 per cent
 Sub-group 1: Materials to be used in the preparation of
 additive for mineral oils when not made in
 Canada.
 B.P. Free, M.F.N. 5 per cent.
 When made in Canada
 B.P. 15 per cent, M.F.N. 20 per cent"⁽³⁾

The company's spokesman said that the existing wording of B.T.N. heading 38.14 is too vague; the use of the words "similar additives" leaves the meaning of the heading unclear; the company expressed doubt about the scope of the heading with respect to components, compounds and mixtures. The spokesman suggested that the General Notes to Chapter 38 of the Brussels Nomenclature make clear the inclusion of "Compounds or mixtures being additives or products for additives when used for mineral oils."⁽⁴⁾ The company's proposal was intended to cover finished additives, additive components and single chemicals or chemically defined compounds when used as additive components; in the B.T.N., the chemically defined products would be classified in headings providing more specifically for them unless an over-riding end-use provision was made. The company noted that the heading excludes some compounds that are themselves additives. It was the view of the company that there was:

(1) Transcript, Vol. 112, p. 16843
 (2) Same, Vol. 112, p. 16834
 (3) Same, Vol. 112, p. 16826
 (4) Same, Vol. 112, p. 16848

"no reasonable way of making the distinction between finished additives and components except by the employment of end-use terminology ... a listing and identification of the chemical components would not serve as an alternate to end-use terminology due to the need for maintaining secrecy in a highly competitive industry and because of the great number of chemicals that would have to be listed as well as the continual change in these chemicals which is characteristic of the additive industry."(1)

Monsanto Canada Limited recommended that petroleum additives be classified according to Brussels heading 38.14 and that the rates of duty be 15 p.c., B.P., 20 p.c., M.F.N. The company further recommended that "tariff item 220e be eliminated and that the duty rate for materials used in the manufacture of additives be that applying to the appropriate Brussels Heading or be that applying to named chemicals or chemical products ... under the appropriate Brussels Heading."(2) The effect of this proposal could be that a number of different rates of duty would apply to a variety of the materials. The company, at the time of the hearing, was not concerned about anti-knock preparations for gasoline, but its recommendations were to apply, in addition to lubricating oil additives, to:

"Fuel additives used to prevent formation of sludge and rust during storage. Additives for prevention of corrosion in pipelines transporting light petroleum fractions such as gasoline and jet fuel."(3)

The firm stressed the need for increased protection due to higher production and development costs in Canada relative to the United States. While Canadian prices for additives were estimated to range from 3 to 11 per cent higher than U.S. prices, Monsanto expressed the view that a 20 per cent M.F.N. Tariff would "provide the minimum protection required for Canadian manufacturers to obtain a portion of the Canadian market."(4) In explaining its position the company said:

"An industry, to operate properly, needs a higher tariff rate than that portion, if any, of the rate it plans to use in order to cover its extra cost ... we would be in a fairly difficult position if the tariff rate just covered our excess costs, with the dynamic nature of the market, the changing prices, and so on."(5)

The spokesman said that 20 per cent has been demonstrated to be a rate which allowed companies to manufacture in Canada and to maintain the market at reasonable prices to the consumers.

Imperial Oil Limited submitted two briefs on heading 38.14, one dealing with oil additives, and the other dealing with anti-knock preparations for use in gasoline. The latter has been noted in the section above on these products. The company recommended that prepared

(1) Transcript, Vol. 112, p. 16832

(2) Same, Vol. 112, p. 16913

(3) Same, Vol. 112, p. 16914

(4) Same, Vol. 112, p. 16918

(5) Same, Vol. 112, p. 16940

additives for mineral oils, excluding gasoline anti-knock compounds classified by B.T.N. heading 38.14, and materials used in the manufacture of these additives classified by either B.T.N. heading 38.14 or 38.19, be dutiable at a rate of 10 p.c. under both B.P. and M.F.N. Tariffs whether made in Canada or not. Other rates of duty would be acceptable on products specifically named in B.T.N. headings 38.14 or 38.19 if these products were not of major significance to Imperial Oil's operations or if they have another use which accounts for a major part of their consumption. The company also proposed the elimination of tariff item 220e.

Imperial Oil expressed the opinion that other proposals embodying a distinction between additives made in Canada and those not made in Canada are not sound if the manufacture of these additives and their raw materials is to be encouraged in Canada. At the same time the company noted that, in its long-term interest, it does not propose duty rates which are so low as to prevent the manufacture of additives in Canada based upon Canadian produced raw materials and intermediates. Imperial Oil's argument is, in part, as follows:

"We believe that today the effective rate of duty on such additive components is the 5 per cent M.F.N. set by end-use Item 220e and that even when a made in Canada status is achieved for one such material, taking it out of the 220e category, it must still face competition from other dissimilar materials which perform the same function, which can still be imported at 5 per cent by virtue of not being made in Canada. While many of these materials are as expensive as the finished additives themselves, today they, in effect, have only 5 per cent duty protection; a further 15 per cent is then provided (total of 20 per cent M.F.N.) to process these into prepared additives. To our way of thinking, this is a complete reversal of the proper emphasis. The duty protection should effectively cover the basic manufacturing stages of additive production. However, we believe that M.F.N. rates of 20 per cent are unnecessary, and that 10 per cent is an adequate level of protection against which to justify these new manufacturing facilities. We seriously question whether Canadian production of additives and complex materials used in their manufacture would be much different with either 10 per cent duty or 20 per cent. However, in the latter case, uneconomic plants might be encouraged ... To the best of our knowledge the additive content of imported lubricating oils has not usually been high. Yet, because of the high proportion of additive cost in the total manufactured cost of finished oils, the importation of finished oil already containing additives must be considered a realistic alternative to buying additives in Canada. We believe it points up the importance of establishing duty rates on additives which are not higher than those in effect on lubricating oils."(1)

The British American Oil Company Limited made a "recommendation that the Customs Tariff be amended to include an item which would provide for duty-free entry of additives, as defined by Brussels No. 38.14, when of a class or kind not made in Canada." (1) The company was vigorously opposed to tariffs on products not produced in Canada, on the grounds that costs to purchasers of the goods are increased with no compensating benefit to any Canadian manufacturer. At the same time, the firm did not oppose "reasonable" rates when required to protect Canadian manufactures.

Texaco Canada Limited, which makes additives for fuel and lubricating oils for its own use, importing the components from its parent company in the United States, supported the proposal of the British American Oil Company in the following words:

"We should like to support the proposals of British American Oil that materials which are essentially not available in Canada as mixtures of imported stocks should actually enter at a low duty level, and that in fact there is no reason for distinguishing between British Preference and Most Favoured Nation because relatively nothing is imported from sources other than the United States ... Therefore, we should like to support the tariff level proposed by British American, that a zero - zero rate be chargeable on components which are not in fact finished additive, and in turn that 10 per cent would be the sufficient level to protect the finished additives when they could be so proved." (2)

The Standard Oil Company of British Columbia Limited proposed that tariff item 220e be incorporated into the permanent tariff structure and that the rates of duty under it be changed from Free, B.P., 5 p.c., M.F.N., to Free under both Tariffs. "It is the opinion of this company that articles of a class or kind not made in Canada should not be dutiable as Canadian manufactured articles or material are not displaced. If such articles are taxed on import, the result is only increased cost to the importer with no corresponding advantage to a Canadian manufacturer." (3)

Nopco Chemical Canada Ltd., on behalf of its subsidiary, Canadian Aniline & Extract Co. Ltd., proposed rates of 15 p.c., B.P. and 20 p.c., M.F.N. for this heading, for products made in Canada. The firm was especially interested in gasoline and lubricating oil antioxidants, anti-corrosive chemicals, petroleum stabilizers and petroleum metal deactivators. The antioxidant of most concern to the firm is ditertiary butyl para cresol, covered by heading 29.06. In speaking of antioxidants not made in Canada, the company saw "no point in penalizing the Canadian user, if they are not made here, until such time as they are made here, when we think they should take the 15 and 20 per cent rates." (4)

(1) Transcript, Vol. 113, p. 17004

(2) Same, Vol. 113, p. 17031

(3) Same, Vol. 113, p. 17036

(4) Same, Vol. 111, p. 16817

The Industry Committee expressed the opinion that all products of heading 38.14 which currently had commercial importance were dealt with in submissions which the Board had received for this hearing. For any other products of heading 38.14, the Committee recommended the classification and rates of duty proposed for an item like B.T.N. heading 38.14; the proposed rates were 15 p.c., B.P., 20 p.c., M.F.N.

<u>Function of Components</u>	<u>Type of Compounds Used</u>	<u>Reason for Use</u>	<u>Mechanism of Action</u>
1. Antioxidants or Oxidation Inhibitors	Organic compounds containing sulphur, phosphorus or nitrogen such as organic amines, sulphides, hydroxy sulphides, phenols. Metals like tin, zinc or barium often incorporated.	To prevent varnish and sludge formation on metal parts. To prevent corrosion of alloy bearings.	Decreases amount of oxygen taken up by the oil thereby reducing formation of acidic bodies. Terminates oil oxidation reactions by formation of inactive soluble compounds or by taking up oxygen. Additive may be oxidized in preference to oil.
2. Anti-corrosives, Corrosion Preventives or Catalyst "Poisons"	Organic compounds containing active sulphur, phosphorus or nitrogen such as organic sulphides, phosphites, metal salts of thiophosphoric acid, and sulphurized waxes.	To prevent failure of alloy bearings by corrosive action. To prevent corrosive attack on other metal surfaces.	Inhibits oxidation so that no acidic bodies are formed or enables a protective film to form on bearings or other metal surfaces. Chemical film formation on metal surfaces decreases catalytic oxidation of the oil.
3. Detergents	Metallo-organic compounds such as phosphates, phenolates, sulphonates, alcoholates. High molecular weight soaps containing metals like magnesium, barium, calcium, tin.	To keep metal surfaces clean and prevent deposit formation of all types.	By chemical reaction or oxidation direction, oil soluble oxidation products are prevented from becoming insoluble and depositing on various engine parts.
4. Dispersants	Metallo-organic compounds such as naphthenates and sulphonates. Organic salts containing metals like calcium, cobalt and strontium.	To keep potential sludge forming insolubles in suspension; to prevent their depositing on metal parts.	Agglomeration and deposition of fuel soot and insoluble oil decomposition products is prevented by breakdown into finely divided state. In colloidal form contaminating particles remain suspended in oil.

<u>Function of Components</u>	<u>Type of Compounds Used</u>	<u>Reason for Use</u>	<u>Mechanism of Action</u>
5. Oiliness, Film Strength, Extreme Pressure (E.P.) and Anti-Wear Agents	Organic compounds containing chlorine, phosphorus and sulphur such as chlorinated waxes, organic phosphates and phosphites such as tricresyl phosphate and zinc dithiophosphate, and lead soaps such as lead naphthenate.	To reduce friction, prevent galling, scoring and seizure. To reduce wear.	By chemical reaction film is formed on metal containing surfaces which has lower shear strength than base metal thereby reducing friction and preventing welding and seizure of contacting surfaces when oil film is ruptured.
6. Rust Preventives	Sulphonates, amines, fatty oils and certain fatty acids, oxidized wax acids, phosphates, halogenated derivatives of certain fatty acids.	To prevent rust of metal parts during shutdown periods, storage or shipment of new or overhauled equipment.	Preferential adsorption of polar type surface active materials on metal surface. This film repels attack of water. Neutralizing corrosive acids.
7. Metal Deactivators	Complex organic nitrogen and sulphur containing compounds such as certain complex amines and sulphides. Some soaps.	Passify, prevent or counteract catalytic effect of metals on oxidation.	Form inactive protective film by physical or chemical adsorption or absorption. Form catalytically inactive complex with soluble or insoluble metal ions.
8. Stringiness and Tackiness Agents	Certain high molecular weight polymers and aluminum soaps of unsaturated fatty acids.	Increased adhesiveness of lubricant on metal surfaces, form protective coating.	Increases viscosity of lubricant and imparts adhesive and tackiness characteristics.

<u>Functions of Components</u>	<u>Type of Compounds Used</u>	<u>Reason for Use</u>	<u>Mechanism of Action</u>
9. Water Repellents	Organosilicon and other polymers, certain higher aliphatic amines and hydroxy fatty acids.	Provide water repellent or resistant properties to non-soap thickened greases and other lubricants.	Surface-active agents form protective film on grease thickeners or other components of lubricants to reduce their affinity for water.
10. Emulsifiers	Certain soaps of fats and fatty acids, sulphonic acids or naphthenic acids.	Used to emulsify soluble oils with water to give coolant lubricant type fluid.	Surface-active chemical agents reduce interfacial tensions so oil can be finally dispersed in water.
11. Antiseptics, Bactericide or Disinfectant	Certain alcohols, aldehydes, phenols, mercuric compounds and chlorine containing compounds.	Used to control odor, foaming, metal staining, emulsion breaking in emulsion type lubricants.	Used in soluble oils to reduce or prevent growth of bacteria causing deleterious effects in emulsion lubricants.
12. Pour Point Depressants	Wax alkylated naphthalene or phenol and their polymers. Methacrylate polymers.	To lower pour point of lubricating oils.	Wax crystals in oils coated to prevent growth and oil absorption at reduced temperatures.
13. Viscosity Index Improvers	Polymerized olefins or iso-olefins. Butylene polymers, methacrylic acid ester polymers, alkylated styrene polymers.	To lower rate of change of viscosity with temperature.	Improvers are less affected by temperature change than oil. They raise viscosity at 200°F more in proportion than at 100°F due to their change in solubilities.

Functions of
Components

Type of Compounds Used

Reason for Use

Mechanism of Action

14. Foam Inhibitors

Silicone polymers

To prevent formation
of stable foam

Reduces interfacial tension so
small air bubbles can combine
to form larger bubbles that
separate faster.

Source: Based on data contained in Transcript, Vol. 112, p. 16919-23

PREPARED RUBBER ACCELERATORS - B.T.N. 38.15The Product and its Characteristics

Rubber accelerators are substances added to rubber prior to vulcanization to improve the physical properties of the vulcanized article and to reduce the time required for the vulcanization process. The use of the accelerator, therefore, is in the manufacture of the rubber product, not in the manufacture of the rubber. These products are of two types, firstly, single chemicals having accelerating properties and, secondly, mixtures or blends of chemicals. Separately defined chemicals supply 80 to 90 per cent of the rubber accelerator market and blends from 10 to 20 per cent of the market. B.T.N. heading 38.15 covers only mixtures and blends; single defined chemicals are covered by different sections of B.T.N. Chapters 28 or 29, and some discussion of them took place at the hearing on products of B.T.N. heading 29.35.⁽¹⁾

These preparations are usually based on organic products such as diphenylguanidine, dithiocarbamates, thiuram sulphides, hexamethylenetetramine and mercaptobenzothiazole, combined with inorganic activators such as zinc oxide, magnesium oxide and lead oxide. They are generally sold by trade names, such as "Santocure MOR-90", a mixture of N-oxydiethylene-2-benzothiazole sulphenamide and MBTS (mercaptobenzothiazole disulphide);⁽²⁾ "Accelerator 108", a mixture of Tuex (tetramethylthiuram disulphide) and M.B.T. (mercaptobenzothiazole disulphide) and "Beutene", a reaction product of Butyraldehyde and aniline. The first is produced in Canada by Monsanto Canada Limited and the last two by Naugatuck Chemicals Division of Dominion Rubber Company Limited.

Rubber accelerators are sold directly to rubber manufacturers, and specific products are used for specific purposes, for example as an accelerator for butyl rubber or for a specialty hard rubber such as that for battery cases.

The Industry

At the time of the public hearing in January 1963, there were only two producers of rubber accelerators in Canada, namely Monsanto Canada Limited at Montreal, Quebec and Naugatuck Chemicals at Elmira, Ontario. As there were only two companies producing these products, industry data were not available from published sources. It was stated in the public hearing by the spokesman for Naugatuck Chemicals that the quantities of rubber accelerators produced in Canada are not large, but facilities exist in the country and the raw materials are available to produce large quantities of these products.

(1) See report on B.T.N. heading 29.35 and Transcript, Vol. 73

(2) Transcript, Vol. 113, p. 17095

Of the raw materials used in the production of mixed rubber accelerators, it was stated in the public enquiry by the spokesman for Monsanto Canada Limited that approximately one-half was available from Canadian sources and the rest imported; many of the materials are themselves accelerators. The proportion of raw materials in the cost of production was stated to be quite high.⁽¹⁾

The process of manufacture of rubber accelerators is simple, involving mechanical blending or simple chemical reaction of the two or more rubber accelerators, and the value added by blending was stated to be negligible.⁽²⁾ Those made by Monsanto were said to be physical blends; some of Naugatuck's were said to be reaction products. Concerning the manufacture of two products, it was stated by Naugatuck Chemicals that:

"TUEX (two parts, tetramethylthiuram disulfide, B.T.N. 29.31) and M.B.T. (one part 2-mercaptobenzothiazole, B.T.N. 29.35) are blended and ground. The resulting tan-coloured powder is called ACCELERATOR 108.

"BEUTENE is the reaction product of one mole aniline and two moles butyraldehyde. Low-boiling by-products are removed and a reddish-brown liquid product obtained by the addition of 15 to 20 per cent process oil."⁽³⁾

These products have been manufactured by Naugatuck Chemicals at Elmira, Ontario since 1944 and 1954 respectively, using some materials produced by the company and others purchased in Canada whenever possible.

The Canadian Market

Data on the consumption, shipment and imports of blended rubber accelerators are not available separately. Of the total Canadian market, as mentioned earlier, 80 to 90 per cent is satisfied by separately defined chemicals and 10 to 20 per cent by chemical mixtures, of which possibly one-quarter to one-half is met by imports, not all of which are necessarily competitive with mixtures made in Canada. Competition from imported preparations was described as negligible.

The imports of total rubber accelerators, including preparations and separately defined chemicals, for eight years, were as follows; it is believed that most of these are separate, chemically defined products and are not, therefore, indicative of the market for mixtures classified by B.T.N. heading 38.15.

(1) Transcript, Vol. 113, p. 17098

(2) Same, Vol. 113, p. 17107

(3) Same, Vol. 113, p. 17103-4

Imports of Rubber Accelerators into Canada, 1956-63

	\$'000
1956	1,340
1957	1,435
1958	1,080
1959	1,255
1960	1,255
1961	1,750
1962	1,640
1963	1,745

Source: Dept. of Trade & Commerce, Import Chemical Trends

In regard to the type of rubber accelerators imported into Canada, the spokesman for Monsanto Canada Limited stated:

"There are certainly a great many rubber accelerator preparations made in other countries which are not made in Canada, and I would suspect that there are very likely small quantities of these coming in."⁽¹⁾

The same spokesman further stated that these imports are made from the U.S.A., U.K., West Germany and other European countries.

Speaking of the competition offered by imported rubber accelerators, the spokesman for Naugatuck Chemicals stated:

"Of this comparatively small volume of imports we know of some which we would consider to be directly competitive with the mixtures produced by Naugatuck, and we would imagine that there are some which are for highly specialized uses and are not competitive. But what we are talking about is not very significant, as seems to be borne out by the approach taken by our customers, the members of the Rubber Association."⁽²⁾

Prices of the accelerators used in Canada are not generally available. However, for the two accelerators produced by Naugatuck Chemicals, a selling price of 80 cents per pound (ton lots, delivered Ontario and Quebec) was mentioned for Accelerator 108, and 70 cents per pound (ton lots, delivered Ontario and Quebec) for Beutene.⁽³⁾

Tariff Considerations

The products of this part of the report are imported principally under the following tariff items:

(1) Transcript, Vol. 113, p. 17096

(2) Same, Vol. 113, p. 17108

(3) Same, Vol. 113, p. 17103-4

<u>Tariff Item</u>	<u>British Preferential</u>	<u>Most- Favoured- Nation</u>
220a	Chemical preparations, compounded of more than one substance, n.o.p.: (i) When dry, or liquid containing not more than two and one-half per centum of proof spirit.....	15 p.c. 20 p.c.
711	All goods not enumerated in this schedule as subject to any other rate of duty, and not otherwise declared free of duty, and not being goods the importation whereof is by law prohibited.....	15 p.c. 20 p.c.

The Industry Committee and the manufacturing companies requested that the accelerators be classified in the Customs Tariff according to B.T.N. heading 38.15.

The companies making submission to the Board requested duty rates of 15 per cent B.P. and 20 per cent M.F.N. Monsanto Canada Limited stated in its submission that:

"Monsanto Canada Limited recommends that rubber accelerator preparations be classified according to Brussels Heading 38.15.... and that they be dutiable at B.P. 15 per cent, M.F.N. 20 per cent without exception."⁽¹⁾

Naugatuck Chemicals stated in its submission that:

"Naugatuck Chemicals recommends that the duty rates for BEUTENE and for ACCELERATOR 108 be those listed for B.T.N. 38.15, viz. the present rates, 15-20 per cent."⁽²⁾

It was urged that all relevant accelerators be classified under such an item without regard to whether they are made in Canada. It was observed by a spokesman that the recommended tariff treatment provides the same level of tariff protection as existing tariff items 220a(i) and 711. The rates were said to provide an incentive for Canadian manufacturers of rubber accelerators.

The Rubber Association of Canada agreed with the proposals for rates of 15 p.c., B.P. and 20 p.c., M.F.N., stating that:

"there is no proposal before the Board that would change the rates of duty on prepared rubber accelerators to the disadvantage of the rubber industry as a consumer of such preparations. In these circumstances, we see no need to submit representations with regard to Brussels Heading 38.15 on behalf of the rubber industry.

(1) Transcript, Vol. 113, p. 17094

(2) Same, Vol. 113, p. 17105

"However, should the Board receive a belated proposal or proposals that the rates of duty under Brussels Group Heading 38.15 be higher than B.P. 15 per cent, M.F.N. 20 per cent we wish to reserve the right to be heard." (1)

The duties asked for by the Industry Committee and the manufacturing companies would amount essentially to no change in the rates of duty as applicable now. No information was submitted to indicate why these rates, in particular, were regarded as appropriate for rubber accelerators. They were the rates proposed generally by manufacturers and the Industry Committee for chemicals.

(1) Transcript, Vol. 113, p. 17112

PREPARED CULTURE MEDIA FOR DEVELOPMENT
OF MICRO-ORGANISMS - B.T.N. 38.16

The products of this heading are described in the Explanatory Notes to the Brussels Nomenclature as:

"various preparations in which bacteria, moulds, microbes, viruses and other micro-organisms required for medical purposes (e.g. for obtaining antibiotics), or for scientific purposes or in industry (e.g. in the manufacture of vinegar, lactic acid, butyl alcohol) can find nourishment and multiply."⁽¹⁾

The heading does not cover unmixed products not prepared as culture media, e.g.:

- (a) Agar-agar (heading 13.03)
- (b) Blood or egg albumin (heading 35.02)
- (c) Gelatin (heading 35.03)
- (d) Peptones (heading 35.04)
- (e) Alginates (heading 39.06)

These products are not within the terms of Reference 120, with the exception of alginates which are discussed under heading 39.06.

Culture media are often prepared from meat extracts, fresh blood, eggs, potatoes, alginates or agar-agar and may contain also glucose, glycerol, salts, acids, alkalis or dyes. It was suggested during the course of the hearing that they are not chemicals or allied products and that, therefore, they should not be considered in Reference 120.⁽²⁾ As noted below, however, to some small extent they may be within Reference 120 because of entry under tariff item 220a.

No submission other than that of the Industry Committee was made to the Board on this heading. The spokesman for the Industry Committee noted that very little information is available concerning prepared culture media, and that the Committee had initiated correspondence in an effort to obtain data. As a result of this, a letter from Ayerst, McKenna and Harrison, Limited was placed on record. The letter provided some of the information that follows about prepared culture media, noting that a large number are prepared from plant and animal origins, and that each is prepared for a specific purpose. The company uses them in production, quality control and research.

These media were said to be not made in Canada but to be imported from the United States and the United Kingdom. Data available at the time of the hearing show imports valued at \$14,737 during the first six months of 1960. Special tabulations show that, during the three month period from October to December 1964, imports of culture media and reagents of s.c. 879-99 were valued at \$21,719, suggesting an annual rate of imports of about \$80,000 or \$90,000.

(1) Explanatory Notes to the Brussels Nomenclature, Vol. 1, p. 364
(2) Transcript, Vol. 113, p. 17126

Culture media used for quality control or for research may be entered under tariff item 220a(i), at rates of 15 p.c., B.P. and 20 p.c., M.F.N. If they were to be used in the production of sera and antisera, toxoids, viruses, toxins and antitoxins, virus and bacterial vaccines, bacteriophage and bacterial lysates, allergenics, liver extracts, pituitary extracts, epinephrine and its solutions, insulin, globin or protamine for use in the diagnosis or treatment of diseases of man, or in the production of biological products for use in the diagnosis or treatment of diseases of animals or poultry, or in the production of blood plasma or serum of human origin, or fractions thereof or extenders or substitutes therefor, they could be imported free of duty under tariff item 206a(4). This item is not within the terms of Reference 120.

The Board was told that:

"no micro-biological or virus laboratory in Canada would import prepared cultures except in the very early stages of an investigation...Therefore....any imports under this Heading would be of the type that would be used in the initial stages of an investigation, and would be primarily for laboratory use, not for industrial production, say, of poliomyelitis virus, or anything like that."(1)

Imports for such use possibly would be entered under tariff item 220a(i) at rates of 15 p.c., B.P. and 20 p.c., M.F.N.

In the absence of other proposals, the Industry Committee recommended that the products of heading 38.16 be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N. The Committee also stated:

"As Item 206(a)4 has not been referred to the Board for review under Reference 120, the Committee recommends that the tariff which it provides for goods of Heading 38.16 be re-located within the framework of this Heading in order to preserve the entirety of its classification structure."(2)

Ayerst, McKenna and Harrison, Limited took the opposite view in its letter, saying:

"It seems logical that quality control and research work... should be granted the same treatment as that extended to production as far as duty rates are concerned. We would, therefore, respectfully recommend that duty rates for Heading No. 38.16 should be free for all categories. We would agree that suitable duty rates be applied if and when these prepared culture media are produced in Canada...there is not a great deal of money involved in these prepared culture media, which no doubt explains why representations have not been made. However, the principle of having two different tariff rates for these materials seems hard to reconcile..."(3)

No further representations were received on products of heading 38.16.

(1) Transcript, Vol. 113, p. 17124

(2) Same, Vol. 113, p. 17115

(3) Same, Vol. 113, p. 17129

PREPARATIONS AND CHARGES FOR FIRE-EXTINGUISHERS;
CHARGED FIRE-EXTINGUISHING GRENADES
B.T.N. 38.17

The present heading includes preparations for fire extinguishers, charges for fire extinguishers, and charged fire-extinguishing grenades. Not included in the heading are fire extinguishers, whether or not portable and whether or not charged, which are operated by means of a pin, by upturning, striking a trigger, etc.; these are classified in B.T.N. heading 84.21. When unmixed chemical products with fire-extinguishing properties are put up as charges for fire extinguishers, they are included in the heading. Charges for fire extinguishers are lightweight containers made of glass, thin sheet metal, etc., designed to be incorporated into fire extinguishers.

Fire-extinguishing grenades are containers charged with fire-extinguishing products, whether or not mixed, and used directly without incorporation into fire-extinguishing appliances. These are glass or pottery containers which are thrown into the heart of a fire and break, freeing their contents; or glass containers, the end of which need only be broken between the fingers to project the extinguishing product.

Some preparations for fire extinguishers make use of bicarbonates, sometimes together with substances to help produce a blanket of foam. The charges for fire extinguishers may contain these preparations, either liquid or dry, or may contain two or more unmixed products separated by a partition and intended to be put into contact at the moment of use. The charge may contain, alternatively, a single, unmixed product, such as carbon tetrachloride, methyl bromide or sulphuric acid.⁽¹⁾

Only two products used in fire-extinguishing preparations were mentioned at the time of the hearing: carbon tetrachloride and sodium bicarbonate. Sodium bicarbonate is commonly used in the portable type of fire extinguisher, in which a copper cylinder is upended to bring together its contents, sodium bicarbonate solution and sulphuric acid, to produce carbon dioxide. Extinguishers of this type are not in Reference 120, nor are they in heading 38.17 of the B.T.N.; they are specifically provided for in B.T.N. heading 84.21

Carbon tetrachloride as a fire-extinguishing fluid is made in Canada by Cornwall Chemicals Limited at Cornwall, Ontario and Dow Chemical of Canada Limited at Sarnia, Ontario. Dow Chemical said that carbon tetrachloride "has minor application in fire extinguishing fluids."⁽²⁾ Cornwall Chemicals said that its fire-extinguishing fluid consists of carbon tetrachloride, a corrosion inhibitor, and a freezing point depressant.⁽³⁾ Carbon tetrachloride was dealt with in the discussion of B.T.N. heading 29.02. The carbon tetrachloride fire-extinguishing preparation made by Cornwall Chemicals is known as "F.E.F.", while that of Dow Chemical is known as "carbon tetrachloride X".

(1) Explanatory Notes to the Brussels Nomenclature, p. 364

(2) Transcript, Vol. 42, p. 6254

(3) Same, Vol. 113, p. 17135

Carbon tetrachloride is dutiable under tariff item 711 at rates of 15 p.c., B.P., 20 p.c., M.F.N.; this item or tariff item 220a(i), which provides for the same rates of duty, probably would apply to the forms used in fire-extinguishers. Both manufacturers proposed that these rates apply to the carbon tetrachloride mixtures classified by heading 38.17; continuation of these rates was proposed by these companies at the time of the hearing on heading 29.02. No recommendation was made for other fire-extinguishing preparations, including bicarbonates, methyl bromide, aluminum sulphate, or sodium hydrogen carbonate solutions which were named as examples of charges for fire extinguishers in the Explanatory Notes to B.T.N. Heading 38.17.

The only opposition to this proposal came from the Canadian Pulp and Paper Association, whose members use carbon tetrachloride in mill fire extinguishers. On behalf of its members, the Association said:

"we must strongly oppose any revision which would result in an increase over current tariff rates, either now or in the future, in respect of the chemicals used by the pulp and paper industry."

This was based on the "absolute necessity of avoiding increased costs."⁽¹⁾

In January 1963, Laurentian Concentrates Limited opened a new plant for the manufacture of protein-based, foam-type fire extinguisher materials.⁽²⁾ No representation was made to the Tariff Board, but the type of material made is classified currently under tariff item 220a(i), "chemical preparations, compounded of more than one substance, n.o.p..." and dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N.

The Industry Committee said:

"Goods of Heading 38.17 were reported to the Committee as subject to tariff treatment only by Item 220a(i) which is in Reference 120.

"The rates shown for Heading 38.17 in the Committee's submission are the recommendation of Canadian manufacturers of fire extinguishing preparations which are the only products that were reported for the Heading. As these are the rates generally recommended for products of the Canadian Chemical industry, the Committee recommends them as appropriate treatment for any other products of Heading 38.17."⁽³⁾

No indication was given by the producers or the Committee of the extent of imports or of the more general competitive situation. Hence, no reasons based specifically on them were advanced for the recommended rates which, as the Committee pointed out, were the rates generally recommended for chemical products.

⁽¹⁾ Transcript, Vol. 36, p. 5246

⁽²⁾ Chemistry in Canada, March, 1963, p. 34

⁽³⁾ Transcript. Vol. 113, p. 17132

COMPOSITE SOLVENTS AND THINNERS FOR
VARNISHES AND SIMILAR PRODUCTS - B.T.N. 38.18

This heading covers solvents and thinners used in the preparation of varnishes, paints and similar products, (even if suitable for other uses) provided that they are not separate chemically defined compounds of a more specific heading. They are generally volatile liquids which dissolve the other constituents of the varnish or paint and produce a solution of a consistency suitable for use; they evaporate after application. Examples of the solvents classified to this heading are mixtures of acetone, methyl acetate and methanol, and mixtures of ethyl acetate, butyl alcohol and toluene.

The heading also covers paint removers consisting of the above mixtures with the addition of small quantities of paraffin wax (to retard evaporation of the solvents), emulsifiers, gelling agents, etc.

Nail polish remover put up in small packages for retail sale, as described under heading 33.06, is excluded; it might be entered under existing tariff item 220a at rates of 15 p.c., B.P., 20 p.c., M.F.N.

A spokesman for Canadian Chemical Company, Limited outlined as follows the solvent production process used by the company, starting mainly with petroleum gases.

"the process employed by Canadian Chemical, at Edmonton, involves oxidation of a mixed hydrocarbon feedstock, and gives rise to a product which is inherently a mixture of chemicals. Subsequent operations include isolation and purification of individual chemicals, which may be sold as such or which may be utilized by the company in the production of a further range of chemicals... Because of present markets and costs it is uneconomic to isolate as commercially pure compounds, each individual component of the oxidized hydrocarbon stream. By combination of azeotropic, extractive and reduced pressure distillation procedures however, various mixtures of certain of these oxygenated hydrocarbon components are produced. In some cases these are designed for utilization by appropriate industries as mixtures without further change; in others esterification with acetic acid is employed to give mixed acetates. In a few cases...pure chemicals and mixtures...are blended to widen the range and to extend the application of our products."(1)

Only Canadian Chemical Company, Limited appeared before the Board on this heading, although a letter from Shawinigan Chemicals Limited was read into the record.(2) These companies are major manufacturers of composite solvents and thinners but the products are made by petroleum refineries from crude oil. Market data are not available but imports and exports are small.

(1) Transcript, Vol. 114, p. 17160-1

(2) Same, Vol. 114, p. 17184

The products of heading 38.18 may be dutiable under tariff item 220a(i) or 220a(ii), as chemical preparations compounded of more than one substance; when dry, or liquid, containing not more than two and one-half per centum of proof spirit, the rates of duty are 15 p.c., B.P. and 20 p.c., M.F.N.; all others, under item 220a(ii), are dutiable at a rate of 25 p.c. under both Tariffs. If any article in item 220a contains more than forty per cent of proof spirit, it is dutiable at \$2 per gallon plus 20 p.c. under both B.P. and M.F.N. Tariffs. Some products, as reaction mixtures, may be dutiable under tariff item 208t at Free, B.P., 15 p.c., M.F.N., or under item 711 at 15 p.c., B.P., 20 p.c., M.F.N.

Canadian Chemical Company, Limited proposed "that the chemical mixtures produced by the company...classified under B.T.N. 38.18... attract rates of duty of 15 per cent B.P. and 20 per cent M.F.N."⁽¹⁾ The company suggested that chemical mixtures should **not** carry rates of duty lower than those recommended for the principal chemicals of which they are composed.

Shawinigan Chemicals Limited supported the above rates for mixed solvents under this heading, and said:

"We also endorse their statement to the effect that the duty rates on mixed solvents should not be lower than those recommended for the major individual components."⁽²⁾

The Industry Committee noted that the rates shown for heading 38.18 in the Committee's submission are recommendations of Canadian manufacturers of composite solvents and competitive products.⁽³⁾

(1) Transcript, Vol. 114, p. 17162

(2) Same, Vol. 114, p. 17184

(3) Same, Vol. 114, p. 17147

CHEMICAL PRODUCTS AND PREPARATIONS OF THE CHEMICAL OR ALLIED INDUSTRIES (INCLUDING THOSE CONSISTING OF MIXTURES OF NATURAL PRODUCTS) NOT ELSEWHERE SPECIFIED OR INCLUDED; RESIDUAL PRODUCTS OF THE CHEMICAL OR ALLIED INDUSTRIES, NOT ELSEWHERE SPECIFIED OR INCLUDED - B.T.N. 38.19

B.T.N. heading 38.19 covers a wide range of products of the chemical or allied industries which are not classified in other headings of Sections V, VI or VII or of other sections of the Nomenclature. With four exceptions -- cultured crystals, ink removers, stencil correctors and plasters and preparations for dentistry -- this heading does not apply to separate chemically defined elements or compounds. The chemical products classified here are products whose composition is not chemically defined, whether they are obtained as by-products of the manufacture of other substances or prepared directly. The chemical or other preparations may be mixtures or solutions. Solutions of the products of Chapter 28 and 29 in solvents other than water are included here.(1)

In contrast to its approach to the meaning of other B.T.N. headings, the Industry Committee noted that it does not recommend adherence to the meaning of heading 38.19 as defined in the Brussels Nomenclature. The Committee substantially adopted the meaning of the other headings of Brussels Nomenclature that fall within the terms of Reference 120. However, B.T.N. heading 38.19 is a residual classification that includes commodities that are not chemicals and that are not within Reference 120.

The Industry Committee noted that B.T.N. heading 38.19 derives its meaning from association with 1,096 other headings, in the B.T.N., in contrast to only about 200 B.T.N. headings which the Industry Committee proposed for adoption in the Canadian Customs Tariff, owing to limitations in the scope of Reference 120.

A spokesman for the Industry Committee suggested that, to confine the scope of an item like B.T.N. heading 38.19 to that relevant to the remainder of the Canadian Customs Tariff, it might be necessary to insert a statement of interpretation. This would indicate that the item applied to products not elsewhere specified in the Customs Tariff. As long as the phrase "not elsewhere specified or included", which appears in the heading, is interpreted in the context of the Customs Tariff rather than in the context of the remainder of the Brussels Tariff Nomenclature, the difficulty of extending beyond the terms of Reference 120 would be avoided, or at least minimized.

This lack of correspondence between the Canadian Customs Tariff and the Brussels Nomenclature dictates the need to specify those sections of B.T.N. heading 38.19 that fall within the terms of Reference 120. The Explanatory Notes to the Brussels Nomenclature identify a number of commodities included in this heading. The Industry Committee indicated which of these it considers to be within the terms of the Reference as follows:(2)

(1) Explanatory Notes to the Brussels Nomenclature, 1955, Vol. 1, p. 365

(2) Transcript, Vol. 115, p. 17230

EXAMPLES OF GOODS CLASSIFIED IN BRUSSELS
NOMENCLATURE BY HEADING 38.19

PROPOSED
 STATUS UNDER
REFERENCE 120

I - Chemical products and preparations of the
 chemical or allied industries

- | | |
|---|----|
| (1) Cultured crystals (other than optical elements) weighing not less than 2.5 grams each. (Other cultured crystals are classified in Chapter 25, 28 or 90). | IN |
| (2) Naphthenic acid and sulphonaphthenic acid and their salts other than those of Heading 34.02 (surface active agents), 28.49 (precious metal derivatives), 28.50 (radio active derivatives), 28.51 (isotope derivatives), and 28.52 (derivatives of uranium, thorium or rare earth metals). | IN |
| (3) Petroleum sulphonates other than water soluble petroleum sulphonates (34.02). | IN |
| (4) Mixed alkylbenzenes and mixed alkyl-naphthalenes, such as those used for preparing surface active products by sulphonation. | IN |
| (5) Polychlorodiphenyls and chloroparaffins, not having the character of artificial waxes (34.04). | IN |
| (6) Mixed polyethylene glycols not having the character of artificial resins (Chapter 39) or artificial waxes (34.04). | IN |
| (7) Mixed glycerol stearates not having the character of artificial waxes (34.04). | IN |
| (8) Fusel oil, i.e. a product from the rectification of crude ethyl alcohol | IN |
| (9) Dippels oil, i.e., a product from the distillation of bones or horns. | IN |
| (10) Ion exchangers (including base or acid exchangers) other than artificial resins of Chapter 39 | IN |
| (11) Anti-scaling compounds, i.e., preparations for preventing or mitigating the effects of water hardness salts in boilers or other equipment using water. | IN |
| (12) "Solid hydrogen peroxide", i.e., a preparation consisting of hydrogen peroxide and urea. | IN |
| (13) "Oxylith", i.e. a preparation consisting of sodium peroxide and copper or nickel salts. | IN |

EXAMPLES OF GOODS CLASSIFIED IN BRUSSELS
NOMENCLATURE BY HEADING 38.19

PROPOSED
 STATUS UNDER
REFERENCE 120

I - Chemical products and preparations of the
chemical or allied industries (Cont'd)

- | | |
|---|-----|
| (14) Catalyst preparations such as those consisting of a chemical (e.g., vanadium oxide) fixed on an inert material (e.g., silica). | IN |
| (15) Hardening agent preparations, e.g., a mixture of ammonium chloride and urea such as is used to harden varnish or glue. | IN |
| (16) Getters for vacuum tubes. | OUT |
| (17) Antifreeze preparations, e.g., mixtures with basis of glycol derivatives. | IN |
| (18) Antioxidant preparations other than those which are additives for mineral oils (38.14). | IN |
| (19) Anti-acid additives for cements, e.g., mixtures of sodium silicate and sodium fluosilicate. | IN |
| (20) Hydraulic power transmission fluid preparations containing less than 70 per cent by weight of petroleum or shale oils (B.N. 27.10). | ? |
| (21) Deodorants other than those having the character of medicaments (B.N. 30.03), toilet products (B.N. 33.06) or disinfectants (38.11). | IN |
| (22) Ink removers put up in packings for sale by retail. (These are usually aqueous solutions of chemically defined compounds, e.g., chloramine 29.36). | IN |
| (23) Stencil correctors put up in packages for sale by retail. (These are usually pink coloured varnishes). | IN |
| (24) Preparations used mainly for clarifying wines and other fermented beverages. | ? |
| (25) Meat tenderizing preparations, e.g., mixtures of proteolytic enzyme with dextrin, salt and other ingredients. | IN |
| (26) Non-agglomerated metallic carbide preparations, e.g., tungsten carbide preparations for the manufacture of tool tips of B.N. 82.07 | ? |
| (27) Foundry core binders not based on natural resinous products (38.10) | ? |

EXAMPLES OF GOODS CLASSIFIED IN BRUSSELS
NOMENCLATURE BY HEADING 38.19

PROPOSED
 STATUS UNDER
REFERENCE 120

I - Chemical products and preparations of the
chemical or allied industries (Cont'd)

- | | |
|--|----|
| (28) Paint extender preparations, e.g., mixtures of chalk and talc. | ? |
| (29) Preparations for manufacture of certain ceramic articles (e.g., artificial teeth B.N. 90.19). | ? |
| (30) Fusible ceramic firing testers, e.g., a preparation in the form of small pyramid which softens and collapses at a specified temperature. | ? |
| (31) Plasters specially prepared for dental uses, (e.g., taking impressions and making models). Such plasters may consist of specially calcined gypsum alone or of calcined gypsum mixed with other substances such as accelerators, retarders, colouring agents and flavours. Heading 38.19 does not however include dental cements and fillings (B.N. 30.05) and "dental wax" and dental impression compounds in plates, horseshoe shapes and the like (B.N. 34.07). | ? |
| (32) Soda-lime, i.e., a preparation of lime and sodium hydroxide, used mainly as a chemical laboratory reagent. | IN |
| (33) Refractory cements or mortars, e.g., preparations of earths, in forms suitable for use in lining furnaces. | ? |
| (34) Diagnostic reagent preparations other than those designed to be applied to the patient (B.N. 30.02 or 30.05). | IN |
| (35) Humidity indicating preparations, e.g., silica gel impregnated with cobalt chloride. | IN |
| (36) Anti-rust preparations, e.g., a solution of lanolin in a light mineral oil. | IN |
| (37) Food curing salt preparations, e.g., a mixture of sodium chloride, sodium nitrate and sugar. | IN |
| (38) Bolt and nut release preparations containing less than 70 per cent by weight of petroleum or shale oils and also containing chlorinated organic compounds, surface active preparations or other chemicals. | IN |

EXAMPLES OF GOODS CLASSIFIED IN BRUSSELS
NOMENCLATURE BY HEADING 38.19

I - Chemical products and preparations of the
chemical or allied industries (Cont'd)

- (39) "Carbon" blocks, plates, bars and similar semi-manufactures (other than those of Heading 38.01), of metallographitic or other grades, but not including mixtures containing powdered silver (B.N. 71.05), or special shapes, or articles which have been surface worked or surface finished (B.N. 68.46 or 85.25), or refractory goods fired as ceramics, based on amorphous carbon or natural graphite (B.N. 69.02 or 69.03). ?
- (40) Carbonaceous paste preparations, e.g., Soderberg paste. IN
- (41) Certain unmounted cut elements of piezo-electric materials other than those (e.g., quartz and tourmaline) described by B.N. Headings 71.02 and 71.03. ?

II - Residual products of the chemical or allied
industries,

- (1) Residual lyes (whether or not concentrated) from the manufacture of wood pulp by alkali or sulphate processing. These may be used as a source for tall oil or for sodium hydroxide. IN
- (2) Alkaline iron oxide such as is obtained as a by-product from a process for the extraction of aluminum from bauxite. It may be used for purification of coal gas. IN

The Industry Committee also listed a number of goods brought to the Board's attention under other headings or at other hearings but which probably exist in commerce in forms that would be classified by B.T.N. heading 38.19.⁽¹⁾ These are as follows, with the B.T.N. heading added under which the reference occurred.

<u>Goods</u>	<u>Hearing Date</u>	<u>Transcript</u>		<u>B.T.N. Heading</u>
		<u>Volume</u>	<u>Page</u>	
Hydrocarbon mixtures	16-5-61	40	5910	29.01
Hydrocarbon mixtures	23-5-61	42	6180	29.01
Halogenated hydrocarbons	23-5-61	43	6403	29.01
Butyl phenol mixtures	19-6-61	51	7804	38.19
Sorbitan stearates	28-9-61	62	9253	29.14

(1) Transcript, Vol. 115, p. 17227

Goods	Hearing Date	Transcript		B.T.N. Heading
		Volume	Page	
Glycerol stearates	28-9-61	62	9270	29.14
Blended plasticizers	12-10-61	65	9765	29.15
Blended plasticizers	12-10-61	65	9801	29.15
Blended plasticizers	12-10-61	65	9862	29.15
Rubber processing preparations	22-1-62	68	10366	29.22
Rubber processing preparations	22-1-62	68	10420	29.22
Dinitrosopentamethylene tetramine blends	26-2-62	70	10772	29.26
Bleaching preparations	26-3-62	73	11072	29.35
Antioxidant preparations	26-3-62	73	11195	29.35
Antioxidant preparations	27-3-62	74	11215	29.35
Rubber processing preparations	27-3-62	74	11229	29.35
Hydrolyzed animal matter	14-5-62	80	12206	38.19
Naphthenic acid derivatives	30-10-62	100	15173	32.11
Sulphate black liquor products	7-11-62	104	15809	38.05
Sulphate black liquor products	8-11-62	105	15845	38.06

The classification of most of the products which the Committee indicated were in Reference 120 requires little comment beyond that in the following product reports; however, four of them need some explanation.

The first product, cultured crystals, is dutiable under tariff item 711 which is in the Reference in so far as it relates to chemicals. The Board considers it doubtful whether the crystals are chemicals; these products were not brought to the Board's attention specifically, and they are not dealt with further in this report. Dippel's oil (ninth on the list) is, similarly, dutiable under item 711 and probably not a chemical; it has been discussed in the report because it was brought to the attention of the Board at the hearing. Solid hydrogen peroxide (number 12) has been transferred in the Brussels Nomenclature from heading 38.19 to heading 28.54. Food curing salt preparations (number 37) are dutiable under tariff item 220a if they do not contain sugar and are within the Reference. However, any that do contain sugar are dutiable under tariff item 141 which is not in the Reference. Both forms are classified in B.T.N. heading 38.19. Bolt and nut release preparations (number 38) are in the Reference if not lubricating oils but not in the Reference if they are lubricating oils. Lubricating oils composed wholly or in part of petroleum are dutiable under tariff item 271 which is not in the Reference; those preparations that are in the Reference are dutiable under tariff item 220a.

The Industry Committee has left the classification of a number of products undecided and has indicated these with a question mark. The Board's information on them is summarized as follows. Hydraulic power transmission fluid preparations (number 20), if wholly or partly of petroleum lubricating oils, are dutiable under tariff item 271 and, accordingly, are not in Reference 120; otherwise, the

preparations are dutiable under tariff item 220a and in the Reference. Preparations used mainly for clarifying wines and other fermented beverages, (number 24), are dutiable under item 220a. The same is true of numbers 26 and 27, non-agglomerated metallic carbide preparations and foundry core binders not based on natural resinous products; core binders that contain synthetic resins may be entered under tariff item 904. If the preparations for manufacture of certain ceramic articles (number 29), contain a chemical, they are in heading 38.19 and are dutiable under tariff item 220a. Fusible ceramic firing testers and refractory cements or mortars, (numbers 30 and 33 respectively) are not in the Reference. The fusible ceramic firing testers, also known as pyrometric cones are dutiable under tariff item 711, while refractory cements or mortars are dutiable under item 282a. Those plasters specially prepared for dental uses (number 31) that are composed only of calcined gypsum are dutiable under tariff item 293 and are not in the Reference; however, if other materials are added, they are dutiable under item 220a and in the Reference. If the carbon blocks, plates, bars and similar semi-manufactures (number 39) are mixtures of natural or artificial graphites with artificial resins, they are in heading 38.19 and dutiable under tariff item 904; if not classified as parts of the apparatus with which they are to be used, or under an end-use tariff item, they may be entered under item 314, which is not in Reference 120. Otherwise, they are dutiable under tariff item 711 and, to that extent, are in the Reference if regarded as chemical preparations. The unmounted cut elements of piezo-electric materials (number 41) are dutiable under tariff items 208t and 220a, and, therefore, in the Reference.

Not all of the products listed by the Industry Committee or by the Board as being in heading 38.19 are dealt with in the report that follows. Only products brought to the Board's attention either during the hearing on heading 38.19 or at some other time during the Reference are discussed.

The Industry Committee listed the following tariff items within Reference 120 under which goods classified by B.T.N. heading 38.19 are dutiable: 203, 203a, 207d, 208j, 208t, 208u, 216, 218, 219a(1), 219b, 220a(i), 220e, 220g, 262, 263a, 269b, 269(i), 269(ii), 270, 490a, 585a, 663, 663b, 711, 791, 851, 901a(9) and 921. These items provide various levels of duty protection ranging from duty-free entry to rates of 15 p.c., B.P. and to 25 p.c., M.F.N. Proposals by producers of the various products were principally for continuation of rates of 15 p.c., B.P., 20 p.c., M.F.N., for those preparations of a class or kind made in Canada; some proposed Free, B.P., 15 p.c., M.F.N., for those not made. The users frequently requested lower rates of duty, or duty-free entry, for the preparations which they use. In some instances, producers or consumers proposed the continuation of existing rates of duty where these are less than 20 p.c.

The Committee noted that the following goods are classified by B.T.N. 38.19 but may be entered under tariff items which are not in Reference 120:(1)

(1) Transcript, Vol. 115, p. 17228

<u>Product</u>	<u>Tariff Item</u>
Belt dressing	*252
Cutting oils	*271b, 220a(i)
Flotation preparations	*277, 208u, 220a(i) 270, 585a, 711
Prepared bodies for clay products in powder form	*282(a) 792(expired)
Catalysts	*848a, *228(ii)
Alkaline pulping by-products	*445p, 445u
Getters	

* Not in Reference 120

Tariff items 445p and 445u were considered by the Board under Reference 123, Radio, Television and Related Products.

Tariff item 220a and B.T.N. heading 38.19 are not co-extensive. For example, some separate chemicals are classified in heading 38.19 but, not being a preparation compounded of more than one substance, not be dutiable under tariff item 220a. Then, too, B.T.N. heading 38.19 is broad enough to cover some mixtures of natural substances, for example, compounded paint extenders which are mixtures of such natural products as chalk and mica, or mixtures of these natural products with chemical products. Many of the preparations classified in heading 38.19 are duty-free for specified uses under end-use items like item 851 or 791.

This part of the report deals with the goods brought to the attention of the Board specifically under heading 38.19, as well as some noted under various end-use tariff items but only incidentally referred to as classified in this heading. However, when the principal discussion was in terms of the single, chemically-defined product under some other heading, the product is dealt with under that heading even though some commercial mixtures of the product may be classified by heading 38.19. In many instances, companies discussed chemicals as though they were made and used in the form of single, chemically defined product whereas in practice they exist in commerce mostly as impure substances or mixtures. In most of these instances, allusion has been made under the appropriate heading to the possibility of classification under heading 38.19 and this part of the report simply refers back to the earlier parts.

Although complete information is not available on the commercial importance in Canada of products of B.T.N. heading 38.19, it is clear that the market is in excess of \$30 million. The product of by far the greatest commercial size is anti-freeze preparations, the market for which exceeds \$12 million. The anti-freeze preparations are presented first below, followed by catalysts, stabilizers, anti-oxidants and plasticizers. Other preparations of commercial importance are then dealt with, approximately in the order which they came before the Board for hearing; some that received minor attention before the Board are brought together in the concluding section of this part of the report, "Other Products of Heading 38.19."

Anti-Freezing Preparations

Considered here are preparations destined for use in cooling systems of internal combustion engines to prevent damage from the formation of ice at low temperatures. The basic performance characteristic of such preparations is that they must have a freezing point below that likely to be encountered, without lowering the boiling point much below that of water and without corroding the metals and the rubber connections of the cooling system. A variety of materials, either singly or diluted with other substances, have been used for this purpose, including calcium chloride, various oils, denatured ethyl alcohol, methanol and glycerol. However, since their development between the two world wars, preparations based on ethylene glycol have become increasingly important and in recent years have clearly dominated the market; they are the only type of anti-freezing preparations respecting which the Board received representations during the public hearings on Reference 120.

Ethylene Glycol Base Anti-Freeze

Composition

Anti-freezing preparations based on ethylene glycol contain about 95 per cent, by weight, of ethylene glycol; the balance consists of various chemical additives designed to minimize corrosion, electrolytic action and foaming, and to impart colour. An anti-freeze preparation may also contain a small proportion of propylene glycol.

Prior to World War II, and for a brief period during the 1950's, the so-called technical grade ethylene glycol, consisting essentially of monoethylene glycol with only a small percentage of impurities mostly in the form of higher glycols and water, was used in the manufacture of anti-freezing preparations. In more recent years, a blend containing a higher proportion of other glycols has been generally used; this blend, usually referred to as the anti-freeze grade or anti-freeze blend, is somewhat less expensive than the technical grade. It is understood that - at least in Canada - the same basic blend is used by all manufacturers of anti-freeze.⁽¹⁾ At the time of the public hearing it was reported to consist of approximately 92 per cent monoethylene glycol and eight per cent diethylene glycol.⁽²⁾ The manufacture and other aspects of the Canadian market for ethylene glycol are discussed in the volume of the report dealing with B.T.N. heading 29.04.

Among the principal additives used in the manufacture of anti-freezing preparations are borax and various borate salts, defoaming agents and dyes. Unlike the ethylene glycol base, the additives vary from one manufacturer to another and their nature and the exact proportions in which they are combined usually are secret.

Process of Manufacture

In its report under a previous inquiry into ethylene glycol based anti-freeze, known as Reference 114, the Board, in 1955, gave the following description of the manufacturing process:

⁽¹⁾ Transcript, Vol. 118, p. 17804

⁽²⁾ Same, Vol. 144, p. 21462

"The process is a physical compounding or mixing, with no apparent chemical reaction taking place. During the canning operation the anti-freeze is heated to a constant temperature and thoroughly agitated to insure a uniform mixture throughout the batch."(1)

The Board went on to conclude:

"The process of compounding and canning ethylene glycol anti-freeze is scarcely one that, in the strict sense of the word, should be described as 'manufacturing'. It is infinitely less a manufacturing operation than is the production of ethylene glycol."(2)

There is no evidence to suggest that the manufacturing process is any more complex now than it was at the time when the above observations were made. Some of the manufacturers of anti-freezing preparations engage in some development and testing activities; these may have become relatively more important in the 1960's because of the increasing use of aluminum in engine blocks and heads; aluminum is said to be more susceptible to galvanic corrosion than cast iron and its use in engines has necessitated the development of new anti-freeze formulations. Nevertheless, such activities still account for a relatively small portion of the total costs incurred in the manufacture of anti-freezing preparations.

Costs of Manufacture

In the report referred to previously, the Board made the following observations concerning the cost of manufacturing ethylene glycol based anti-freeze in Canada:

"The representative cost of ethylene glycol used, in 1954, ranged from about \$1.15 to about \$1.45 per gallon of anti-freeze produced. The cost of the container ranged from 16 cents to 20 cents per gallon. The total manufacturing cost of ethylene glycol anti-freeze produced ranged from about \$1.45 to about \$1.65 per gallon."(3)

There is no evidence that the relationship between these basic elements of cost has since changed appreciably, although there has been some tendency towards the upper limit of the ranges indicated in the quotation. At the time of the public hearing in 1963, for example, the market price of ethylene glycol, which accounts for between 80 and 90 per cent of the total cost, was equivalent to about \$1.40 per gallon of anti-freeze, while the cost of containers apparently came to about 20¢ per gallon, possibly more. There was also reported to have been some increase in the cost of the chemical additives used in anti-freeze, attributable partly to the changes in formulation necessitated by the increasing use of aluminum in engines; however, the additives still account for only a very small portion of the total cost, being generally valued at less than 5 cents per gallon of anti-freeze.

(1) Report of the Tariff Board in Reference No. 114, Ethylene Glycol for Anti-freeze and Ethylene Glycol Base Anti-freeze, p. 11

(2) Same, p. 17

(3) Same, p. 11

From the figures cited above it is evident that materials and containers account, on the average, for more than 90 per cent of the total cost of anti-freeze preparations and that, consequently, the value added by the manufacturing process is small; this tends to lend support to the conclusion that the manufacture of anti-freezing preparations is not, on the whole, a very complex operation.

As noted in the discussion on ethylene glycol under B.T.N. heading 29.04, the production of anti-freeze is the most important outlet for ethylene glycol, estimated as taking perhaps 75 per cent of the total. The substantial capital investment in facilities to produce ethylene glycol in Canada, therefore, is justified in large measure by the extent to which the company can expect to supply the anti-freeze requirements.

Canadian Market

At the time of the public hearing in 1963 there were, in all, some fifteen firms in Canada engaged in the manufacture of anti-freezing preparations. Two of these, namely Dow Chemical of Canada, Limited, of Sarnia, Ontario, and Union Carbide Canada Limited, of Toronto, are also the only two Canadian manufacturers of the ethylene glycol blend used in the manufacture of anti-freeze; they convert a portion of their output of this blend into anti-freeze themselves, or have it converted by other firms on a contractual basis, and sell the remainder to other manufacturers of anti-freezing preparations. Union Carbide has been making ethylene glycol based anti-freeze in Canada since 1927 and claims to have supplied all of the Canadian market up to about 1946 or 1947.⁽¹⁾ The company only began to manufacture ethylene glycol in 1955 after acquiring the ethylene glycol plant of Dominion Tar and Chemical Company Limited in Montreal East. Dow Chemical, on the other hand, has been manufacturing ethylene glycol at Sarnia since 1948, but only entered the manufacture of anti-freeze on a significant scale in 1955. The company also produces ethylene glycol at Fort Saskatchewan, Alberta. The company sells no anti-freeze under its own brand name.

The other firms manufacture and can anti-freeze from ethylene glycol obtained from the two integrated manufacturers. Commonly referred to as the canners, or packers, they first made their appearance on the Canadian market at the end of the 1940's. Although some have left the field and others have entered it, their total number has remained about the same, about a dozen in all. Most of the unintegrated manufacturers of anti-freeze produce or package other products as well; they include several oil companies, as well as a number of smaller firms. At the time of the public hearing most of the unintegrated manufacturers of anti-freeze preparations, including the oil companies, were under contract to the two producers of ethylene glycol, principally Dow Chemical; there were reported to be only three independent canners at that time.⁽²⁾

The firms that manufacture anti-freeze under contract with an integrated manufacturer receive ethylene glycol from it, process it to his specifications, usually store it and deliver the finished product

⁽¹⁾ Transcript, Vol. 145, p. 21662

⁽²⁾ Same, Vol. 144, p. 21430, 21492

to the glycol manufacturer or customers designated by him. For this they receive a stipulated fee, sometimes referred to as the canning fee. The ethylene glycol manufacturer usually retains control over all marketing aspects and conditions of sale of the finished product; it is for all practical purposes the vendor, if not the manufacturer, of anti-freeze, while the firm engaged in a contractual relationship is merely providing a processing service at a fee. There are also firms which merely can or otherwise package anti-freeze preparations produced and supplied to them by the integrated companies; this is also done on a contractual basis for a fee, with the integrated manufacturer retaining full control over the marketing of the finished product.

Anti-freeze is sold in bulk to motor vehicle manufacturers for installation in new equipment. Both of the integrated producers initially stated at the public hearing that they did not sell anti-freeze preparations in bulk for packaging;⁽¹⁾ Union Carbide later indicated that it was prepared to consider a bulk sale if it were approached and if certain conditions were met.⁽²⁾

Apart from the anti-freeze sold in bulk to motor vehicle manufacturers, the remainder is sold packaged, chiefly in one gallon cans and one quart cans. The principal sales outlet are the oil companies for their service stations, large industrial accounts for fleet trucks, etc., chain stores, and wholesalers who distribute it to retail outlets such as hardware stores or specialty automotive stores. Most manufacturers of anti-freeze in Canada make their own brands as well as canning the so-called "private brands" for large users who wish to sell anti-freeze under their own name and trade mark. It is understood that the integrated manufacturers and the unintegrated independent canners compete at all of these levels of trade. At the time of the public hearing, there were reported to be some 70 different brands of ethylene glycol based anti-freeze offered for sale in Canada;⁽³⁾ this does not necessarily mean that there were that many different formulations manufactured, as the same formulation, except for a possible difference in colour, may be sold to a number of private brand customers.

With respect to a substantial part of the market, that supplied by oil companies through service station outlets, a spokesman for Dow Chemical noted that:

"in recent years we have found ourselves in this position that the oil companies are the major marketers of anti-freeze. They are very large companies, and they have come to us stating that they had facilities of their own for canning their own oil and that sort of thing, and that they could see no reason why they were buying anti-freeze from us in cans when the anti-freeze was being canned by some other company. We have been forced into the position by the oil companies of permitting them to use their canning facilities to can anti-freeze...I think this a trend in the marketing of anti-freeze that is beyond our control."⁽⁴⁾

(1) Transcript, Vol. 118, p. 17821; Vol. 120, p. 18007

(2) Same, Vol. 145, p. 21669-71

(3) Same, Vol. 118, p. 17730

(4) Same, Vol. 145, p. 21635-6

The market for anti-freeze is highly seasonal, most deliveries taking place within a six-week period between September 1st and October 15th. Discounts have at times been offered by some manufacturers for deliveries prior to a certain date, such as July 31st.

At the time of the public hearing in 1963, the manufacturers' f.o.b. price, in large cities, of private brand anti-freeze was reported to be \$1.85 $\frac{3}{4}$ per gallon, federal sales tax included.⁽¹⁾ The price of manufacturers' own and better known private brands of anti-freeze installed in the customer's automobile at a service station was estimated at between \$3.50 and \$3.75 per gallon. Anti-freeze sold over the counter at automotive supply, hardware and other retail stores was reported to have been advertised as low as \$1.87, with a price of \$2.19 per gallon fairly common. On the basis of this information, it would appear that since the last inquiry by the Board in 1954 there has been some decline in prices of ethylene glycol based anti-freeze at all levels of trade, though later evidence indicates that by 1964 and 1965 the price to private-brand customers had risen appreciably from the low level noted above for 1963.

Information concerning Canadian shipments and imports of anti-freeze is not available from published statistics. However, on the basis of the estimated market for ethylene glycol, it would appear that in 1962 the Canadian market for ethylene glycol based anti-freeze comprised some 7.5 million gallons valued at about \$12.5 million. The market for anti-freeze is closely related to motor vehicle registrations; in recent years these have been increasing at an average annual rate of about five per cent, suggesting that by 1965 the Canadian market for anti-freeze was approximately 9 million gallons, having a retail value of about \$18 million.

Owing to its close relationship to motor vehicle use, the market for anti-freeze is distributed across the country in rough proportion to motor vehicle registrations; Ontario and Quebec account for some 60 per cent of total sales; the remainder is distributed fairly evenly among the other regions. This particular geographical distribution, coupled with a relatively high cost of shipping anti-freeze over long distances, has no doubt encouraged the establishment of contract canners across the country; firms engaged in packaging anti-freeze can be found in most of the principal population centers.

Although exact information concerning imports of ethylene glycol based anti-freeze is not available, there is evidence that these are negligible. The two integrated manufacturers of anti-freeze agreed at the public hearing that imports of anti-freeze had not been significant.⁽²⁾ Available information indicates that imports of ethylene glycol based anti-freeze compounds during 1964 were valued at less than \$50,000, all from the United States. Moreover, although imports of ethylene glycol for all uses have been substantial in some years, there is no evidence that independent canners of anti-freeze have imported any appreciable amounts. Most imports apparently were made by one or another of the two producers of ethylene glycol as a result of unusual circumstances.

(1) Transcript, Vol. 119, p. 17938

(2) Same, Vol. 118, p. 17785, 17789

The relative lack of imports of anti-freeze preparations is largely attributable to the fact that, given roughly the same price of ethylene glycol, the cost of manufacturing anti-freeze in Canada and in the United States is comparable.⁽¹⁾ As noted under heading 29.04, the price in Canada of ethylene glycol for duty-free applications, is comparable to that in the United States, but tends to be higher by approximately the amount of the duty for other applications. Since July 3, 1955, ethylene glycol blends imported for use in the manufacture of anti-freeze compounds have been subject to a most-favoured-nation rate of 10 p.c. An unintegrated manufacturer of anti-freeze stated that the Canadian price of ethylene glycol was, at the time of the public hearing, equivalent to "the published American price plus the tariff plus the foreign exchange."⁽²⁾ It would appear from this that in Canada the price of ethylene glycol for the manufacture of anti-freeze might be of the order of 20 per cent higher than in the United States. With ethylene glycol accounting for between 80 and 90 per cent of the cost of anti-freeze, its higher cost alone would tend to make the cost of anti-freeze some 16 per cent higher in Canada than in the United States. This comparison, of course, applies only to the unintegrated canner who purchases ethylene glycol on the open market. The cost of anti-freeze manufactured by the integrated companies would be determined largely by their cost of manufacturing ethylene glycol, rather than the market price. With respect to costs, the integrated manufacturers are, therefore, in a better competitive position than the unintegrated canners; not more than two or three independent canners apparently have continued to operate.

The competition that does exist in the Canadian market for anti-freezing preparations is confined to that which takes place between domestic manufacturers, that is, the two integrated companies and the independent canners. This has been reflected in the prices of anti-freezing preparations, which have shown a tendency to decline during the 1950's and early 1960's. In the course of the public hearing, a spokesman for one of the integrated manufacturers explained the reasons for the competitive relationships prevailing on the Canadian market as follows:

"The facts of life are that if the glycol manufacturer finds himself in the hands of two or three canners whose relationship with the market gives them the effective distribution of the product, the leverage which they can put on a company like Dow is so important that we simply are not prepared to put ourselves in that position. We feel that, having regard to the size of our investment, we must pursue the market right down to the distributor. We certainly haven't the slightest desire to put the independent canner out of business. On the other hand, we are not prepared to put our investment to the hazard of being cut off from large amounts of business by one or two customers; and, moreover -- and this, I think, is the nub of the matter -- Dow has elected to sell glycol in the only way which we feel we can sell it and protect our investment. We are not prepared to be undersold and we will not be undersold. We have on occasion been undersold, and the net result has been simply loss of business. Dow feel, quite properly, that they can't put themselves in the position of being undersold in the anti-freeze market by

(1) Transcript, Vol. 145, p. 21626

(2) Same, Vol. 145, p. 21610

the independent canner, because if they are the very thing we fear is certain to happen -- that the independent canner, selling at lower prices than us, will get the market, or will get a very substantial part of the market -- and the leverage which they would have would simply put us in a hopeless position. Frankly, we feel that we ought not to be expected to be put in this position, and we have pursued a course of action which we think is the only one; having regard for our investment; and we say categorically that we have simply met the competition of the independent canner when it comes to price reduction."⁽¹⁾

The independent canners appearing before the Board argued that the reduction of the margin between their cost of ethylene glycol and the selling price of anti-freeze was making their position in the Canadian market difficult and could force them to abandon the manufacture of anti-freeze altogether.

There is evidence that between 1959 and 1962 there was a narrowing of the margin between the market price of ethylene glycol and the posted prices of private-brand anti-freeze.

From 1959 to 1961, the price of anti-freeze listed by an integrated manufacturer to private label customers in the Montreal area declined from \$2.09 per gallon (packaged in one gallon containers) to \$2.06 $\frac{1}{4}$ while the average price of ethylene glycol to independent canners increased from \$1.402 per gallon of anti-freeze to \$1.445. Thus, the operating margin between the cost of glycol and the price of anti-freeze declined from about 68.8 cents per gallon of anti-freeze to 61.75 cents.

A much greater decline occurred during the 1962 season. The price of anti-freeze declined to \$1.85 $\frac{3}{4}$ per gallon, accompanied by a much smaller reduction in the cost of ethylene glycol to the independent canners. The margin was reduced to 45.55 cents per gallon of anti-freeze. This margin was regarded by the independent canners as insufficient to cover all of the other costs of compounding anti-freeze.

The reduction in the price of anti-freeze appears to have resulted from very keen competition for the business of the private-brand customers. The situation was described by the spokesman for Laurentide Chemicals, one of the independent canners, who stated that the price listed by Dow Chemical early in 1962 was accompanied by three promotional aids, including a promotional assistance of 5 cents per gallon on shipments made by November 1962 guaranteed anti-freeze protection and an "early shipments" discount of 5 cents a gallon for shipping on or before July 31, 1962. Radiator charts for distribution to service station operators was another promotional expense said to be borne, at times, by the integrated producer. The spokesman for Laurentide Chemicals contended that the small, unintegrated producer could not give these inducements and had to consider price discounts to offset them. He went on to say:

"Later on, Dow Chemicals offered to the Montreal area anti-freeze in gallons to \$1.85 per gallon and to \$1.96 per gallon in quarts containers initiating therefore a further reduction on the quoted prices forcing us to grant a corresponding re-

(1) Transcript, Vol. 119, p. 17855-6

duction to the customers already signed in with us. Union Carbide also subsequently reduced their prices of anti-freeze in gallons and quarts containers to \$1.8575 and \$1.9675 per gallon respectively for the Montreal and Toronto metropolitan areas."⁽¹⁾

A spokesman for Dow Chemical noted that it often is difficult to know who initiates a price reduction or just what the price is that a company has to meet or better in order to make a sale at any particular time.

"We have made it clear that we are not prepared to stand by and see our markets lost; that we will meet competition, and we have said categorically that we did not initiate the price decline that occurred in the Montreal market, and I repeat that. We did not in our judgment initiate this particular price decline.

"A price of \$2.09, subject to the proviso, it is my belief, was never an operative price. There is another manufacturer of ethylene glycol -- there are many others of ethylene glycol anti-freeze, but there is at least one other large one, and it is my understanding that their interpretation of the 5-cent allowance for advertising and the 5-cent allowance for delivery prior to July 1, was tantamount to selling the anti-freeze at \$1.99, and my instructions are that this was the price at which that company entered into the market. We had, of course, no alternative but to meet it.

"I might say that in our judgment it is not the same to sell anti-freeze at \$1.99 and sell it at \$2.09 with the allowances that we have provided for...

"this particular opening gambit in the year 1962 never really got going. The price was, in point of fact, initially \$1.99, and it unhappily declined from that level to the level that you are referring to of \$1.85-3/4. We have said that in our judgment the evidence will show that we did not initiate these price cuts. However, they did occur, and they involved hardship...which we freely admit."⁽²⁾

In commenting on the same type of situation in Western Canada, in an earlier year, the spokesman for Dow Chemical stated:

"We contend that the company responsible for reducing the margin between anti-freeze and glycol in 1958 was the Radio Oil Company."⁽³⁾

Union Carbide of Canada, Limited also disclaimed initiation of the price declines. A spokesman stated:

"The evidence will show that on April 1, 1962, our price was \$2.09. On April 11, 1962 we announced a price of \$2.09 less 5 cents early delivery and less 5 cents for advertising.

(1) Transcript, Vol. 144, p. 21466-7

(2) Same, Vol. 144, p. 21541-2

(3) Same, Vol. 145, p. 21656

These were our announced prices which, you will recall, did not result in any sales because of certain situations in the market. We reduced the price on May 2, 1962 to \$1.99. In this reduction we followed the reduction in price. On the other hand, when one looks at glycol, it will be seen that what happened was this, according to the evidence before the Board, that on April 1, 1962 the glycol price was 13.75 cents, and on April 16, 1962 the price on glycol was reduced to 13.1 cents.

"In this area we led the reduction. Whatever the situation was in regard to who changed whatever price there was on anti-freeze, this was a matter where we followed. But, because of the fact that we are not unsympathetic to this problem of price squeeze I do want to draw to the attention of the Board that we sought to have this squeeze reduced, but in the same ratio as there was a reduction in anti-freeze prices. In other words, the ratio of \$2.09 to \$1.99 is in relation to the glycol price ratio of 13.75 cents to 13.1 cents. (1)

The Board has some information to suggest that the price declines of 1962 and 1963 gave way to some strengthening in prices of ethylene glycol and anti-freeze in 1964. The margin between these prices, however, appeared to remain at a level which the independent canners had regarded as unsatisfactory.

Speaking more generally about the narrowing margin between the cost of glycol and the price of anti-freeze, a spokesman for Asbestonos Corporation offered the following observation.

"We started business in 1948. We canned our own anti-freeze up until the year 1958, I believe, at which time again we had a situation where the squeeze between the price of glycol and the price of canned anti-freeze became so small that it did not pay the independent canner to stay in business.

"This year [1963] we have been forced to no longer be independent canners. We are merely canners for one of the suppliers of glycol, and we sell their product under a private brand name known as Asbestonos.

"Quite frankly, even with this situation we have no intention of staying in the business, either as independent canners or as canners for one of the suppliers of ethylene glycol." (2)

Similarly, a spokesman for Radio Oil Refineries described the difficulties, as he saw them, of attempting to carry on business as an independent canner even when he had a large volume of sales. He pointed out that the integrated supplier had substantial control over the margin between the cost of glycol to the independent canner and the price and conditions of sale of the anti-freeze.

(1) Transcript, Vol. 145, p. 21665-6

(2) Same, Vol. 119, p. 17851-2

In commenting upon the advantage that the integrated producer has because of the difference in the factory cost of producing ethylene glycol and its price to the independent canner, the spokesman for Radio Oil Refineries, in commenting on his investigation of costs when considering an ethylene glycol plant at Edmonton, said:

"Ethylene glycol can be manufactured for less than seven cents a pound. Today ethylene glycol can be manufactured in two towns in the United States that I am familiar with for around seven cents, say, one-tenth of a cent either way. These are actual costs."⁽¹⁾

The integrated producer can also control the quantities of ethylene glycol he will make available and when they are to be shipped. The integrated supplier was said also to be effectively in control of all of the other conditions of sale of ethylene glycol, particularly when there was a duty on ethylene glycol. The spokesman went on to point out that a canner working under contract also was very much under the control of the supplier of ethylene glycol with respect to the volume of canning that he was given, the fees and the other conditions of canning and of supplying anti-freeze. These could change from year to year in ways that could affect him unfavourably. The spokesman for Radio Oil Refineries took vehement exception to the imposition or continuation of a duty that would tend to strengthen the position of the integrated company in the market or in its relations with the canner. He expressed the opinion that removal of the duty on ethylene glycol and on anti-freeze, in bulk quantities, would permit Radio Oil Refineries to compete in Western Canada either by obtaining supplies in the mid-West United States or by obtaining supplies of ethylene glycol from Canadian producers at prices and other conditions of sale that took account of these alternative sources of supply.⁽²⁾

A spokesman for Union Carbide, in clarifying that company's position with respect to supplying ethylene glycol, observed:

"Union Carbide has always been able to ship, and has always shipped, glycol to Radio Oil when requested, and similarly to Laurentide. There has never been an occasion when we have not shipped as required. This has not always been easy. There have been occasions when this has caused considerable difficulty but I do not think it has ever been sought to be said that we have not fulfilled orders as they have been made."⁽³⁾

The evidence submitted to the Board by one of the two integrated companies shows that since 1959 the gross margin tended to widen, indicating that the decline in price of anti-freeze was more than offset by a decrease in the manufacturing cost of ethylene glycol. Any such decreasing cost of ethylene glycol would enable the two integrated companies to reduce the price of anti-freeze preparations; if the lower cost of ethylene glycol were not reflected in its market price, the position of the independent canners could deteriorate further and might very well become untenable. In general, the integrated producer has no

(1) Transcript, Vol. 145, p. 21594

(2) Same, Vol. 145, p. 21551 and following

(3) Same, Vol. 145, p. 21664

particular incentive to lower the price of ethylene glycol to the independent canner. His prime concern is to ensure that he has the largest possible demand for his glycol. This he can do by controlling its disposition right through to the sale of the anti-freeze preparations, thus running the least possible risk of losing the orders for glycol to another source of supply, either in Canada or abroad.

There is evidence that the number of independent canners has declined considerably. There were reported to be about one dozen independent canners in existence at the time of the Board's previous inquiry into anti-freeze in 1954; only three independent canners were said to remain at the time of the public hearing in 1963 and this number seems to have declined since. Many of the firms which sold anti-freeze on their own account in 1954 have made canning contracts. It may be noted that in the United States by far the largest portion of the anti-freeze market is, apparently, supplied by integrated companies; there are very few, if any, independent canners. The far greater concentration in that country is also reflected in the relatively small number of brands; it was estimated at the time of the public hearing that there were only some 100 brands of ethylene glycol based anti-freeze sold in the United States compared to about 70 offered in the much smaller Canadian market.⁽¹⁾

Another trend which may be having an unfavourable effect on the operations of the unintegrated companies is the tendency, noted at the public hearing, on the part of some oil companies to blend and can anti-freeze for their own use and under contract for the glycol producers.

Summary - It is evident from the foregoing that the Canadian market for ethylene glycol based anti-freezing preparations is substantial and that it is growing in rough proportion to the growth in automobile ownership. Virtually all the market is being supplied from domestic production. The relative lack of imports is due to a number of factors, including the fact that there does not appear to be any appreciable difference in the cost of compounding anti-freeze in Canada and in the United States, the most likely source of imports, and the fact that there is an M.F.N. duty of 15 p.c. on ethylene glycol based anti-freeze. Moreover, the 10 p.c. duty on ethylene glycol for use in the manufacture of anti-freeze discourages an independent canner from attempting to use imported ethylene glycol.

The competition that does exist is confined to domestic manufacturers. In this, the integrated manufacturers have advantages over the independent canners through the supply and price of ethylene glycol, and because of their greater corporate strength and ability to serve more effectively the needs of private brand customers who operate nation-wide. It is also apparent from the evidence that one of the integrated producers intends to exploit this advantage to ensure that none of the independent canners gains a "very substantial portion of the market."

Under these circumstances, the role of the independent canner in the Canadian market and his ability to survive in face of the competition from the integrated companies deserve comment. As noted earlier,

⁽¹⁾ Transcript, Vol. 118, p. 17756

a number of formerly independent canners have entered into canning contracts with an integrated manufacturer. It has also been noted that in the United States independent canners are extremely rare, if not non-existent. The tendency on the part of the large oil companies to blend and can anti-freeze has also been observed. All of these trends indicate that the importance of independent canners has declined appreciably. Furthermore, in the face of the determination of the integrated manufacturers not to be undersold in the anti-freeze market and to prevent independent canners from gaining a substantial portion of it, it is doubtful whether a change in the tariff treatment of ethylene glycol or ethylene glycol based anti-freeze would be of material assistance to the independent canner in improving his position in the Canadian market.

This conclusion is supported by a spokesman for one of the integrated companies who said:

"We do say, however, that manipulating the tariff on ethylene glycol will not cure the problem. If there were no duty on ethylene glycol it would still be open to the Dow Chemical Company, and also to Union Carbide, to choose to meet market prices on ethylene glycol by offering anti-freeze at prices which would make it uneconomic to can glycol of U.S. manufacture. The power to put this pressure on an independent would not change, in my judgment."(1)

In the same vein, a spokesman for Union Carbide, in reply to the spokesman from Radio Oil Refineries, observed:

"I do not believe, and I so submit, that he has not established that his problem relates to tariff. In other words, what I am saying is that whatever the tariff had been as the evidence would indicate there is no assurance he would not have been in exactly the same position. Whether or not there was a tariff in earlier years he could have been put in exactly the same position, and what happened to him could still have happened to him.

"If -- and I use a great big 'if' because I am not trying to take any sides -- if as he suggests there has been some design to put him in a difficult position competitively then I submit that this could have been irrespective of the tariff. The tariff is not his problem."(2)

On the other hand, a duty on ethylene glycol for anti-freeze or on the anti-freeze preparations naturally places the integrated producer in a more favourable position not only with respect to the independent canner but also with respect to the price of anti-freeze preparations to the consumer. The absence of a duty might assist a few companies to operate as independent canners in local market areas.

(1) Transcript, Vol. 144, p. 21542

(2) Same, Vol. 145, p. 21668

It is evident that if all of the Canadian market for anti-freeze were supplied by the two integrated companies, either from their own canning operations or through canners under contract to them, the need for tariff protection on anti-freeze and on the ethylene glycol for use in the manufacture of anti-freeze must rest primarily on any cost disadvantage they are under with respect to the manufacture of ethylene glycol, a disadvantage claimed but not established.

Tariff Considerations

Since June 3, 1955, ethylene glycol based anti-freezing compounds have been specifically provided for in tariff item 207d at a rate of 15 p.c. under both the British Preferential and the Most-Favoured-Nation Tariffs. Prior to that time the product was classified under tariff item 220a(i) at 15 p.c., B.P. and 20 p.c., M.F.N. In the Tariff Board's report in 1955, in recommending the reduction in the most-favoured-nation rate, the majority of the Board concluded:

"While a rate of 10 per cent cannot well be regarded as being more than a moderate protection for the ethylene glycol industry, a rate of 20 per cent on the compounding and canning of anti-freeze is, in our opinion, out-of-line and unnecessarily high, even with a rate of 10 per cent on ethylene glycol."(1)

As noted earlier, imports under tariff item 207d have usually been very small; in 1964, for example, they apparently were valued at less than \$50,000, all from the United States.

During the public hearing, written or verbal representations were received from the two integrated companies - Dow Chemical of Canada, Limited and Union Carbide Canada Limited - and from two independent canners, namely Laurentide Chemicals Inc., of Shawinigan, P.Q. and Radio Oil Refineries Limited of Winnipeg, Manitoba. In addition, a spokesman for Asbestonos Corporation offered comments. These representations also are dealt with in the discussion of ethylene glycol under heading 29.04

In a written submission, Union Carbide requested the continuation of the existing differential of 5 percentage points between the rate of duty on ethylene glycol and that on ethylene glycol based anti-freeze. Having proposed rates of 15 p.c., B.P. and 20 p.c., M.F.N. on ethylene glycol, the company asked that the rate on anti-freeze made from it be increased to 20 p.c., B.P. and 25 p.c. M.F.N.(2)

In support of its proposal, the company stated that the differential was required to make the protection on ethylene glycol effective. It argued that, given identical rates of duty, there is an advantage, arising out of the incidence of sales tax, in importing anti-freeze rather than ethylene glycol. The company observed that

(1) Cited work, p. 17

(2) Transcript, Vol. 118, p. 17726

the differential of 5 percentage points between the present rates of 15 p.c. on anti-freeze and 10 p.c. on ethylene glycol has been sufficient to prevent imports of anti-freeze and that, while at one time the differential was as high as 20 percentage points, the experience since 1955 indicates that the differential of 5 percentage points has the desired effect.(1)

When questioned by the Board, a spokesman for Union Carbide agreed that if the duty on ethylene glycol is set at a level sufficiently high to prevent imports altogether, the differential ceases to have a meaning; he thought that this might happen if the rate on ethylene glycol were set at 25 p.c., but that at 20 p.c. or less a differential was still required. The spokesman also indicated that, given a choice between maintaining the margin offered by the existing rates of 15 p.c. on anti-freeze and 10 p.c. on ethylene glycol or having the margin removed by raising the duty on ethylene glycol to 15 p.c., the company would prefer the latter course.(2)

Apart from the desire to maintain a margin over the level of protection on ethylene glycol, Union Carbide offered no other argument or evidence in support of its request for an increase in the duty on anti-freeze; as noted earlier, the company contended that the present rate of 15 p.c. has been sufficient to prevent imports of anti-freeze. Moreover, independent canners have apparently made no significant importations of ethylene glycol over the 10 p.c. rate of duty.

A spokesman for Dow Chemical observed that, although at the hearing on ethylene glycol the company had proposed rates of 15 p.c., B.P. and 20 p.c., M.F.N. for all ethylene glycol products, it did not oppose the request by Union Carbide for a differential between ethylene glycol and anti-freeze.(3) The spokesman for the company clarified its position further as follows:

"We are interested in the absolute level of duty on ethylene glycol primarily, and we do suggest that there is something to be said for a differential between ethylene glycol and anti-freeze; but if the Board felt it could not raise the duty on anti-freeze and could raise the duty on ethylene glycol we certainly wouldn't hesitate to agree".(4)

Dow Chemical did not offer any argument in support of its original proposal that the most-favoured-nation rate on ethylene glycol based anti-freeze be increased to 20 p.c.; it agreed with Union Carbide that imports have not been substantial. Rates of 15 p.c., B.P., 20 p.c., M.F.N. were proposed generally by the company, and indeed by the industry, for chemicals made in Canada.

In the course of the presentation of the company's submission dealing primarily with ethylene glycol, the spokesman for Laurentide Chemicals stated:

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- (1) Transcript, Vol. 118, p. 17733
 - (2) Same, Vol. 118, p. 17800
 - (3) Same, Vol. 119, p. 17917
 - (4) Same, Vol. 118, p. 17799

"With respect to anti-freeze itself they ask for an increase of 5 per cent, and we support that. We would not want to see any imported anti-freeze in Canada. There are more than enough canners around."(1)

When asked what the effect of the existing duty on anti-freeze was, the same spokesman made the following observation:

"As it is, it is not interesting. Nobody would be interested to import. You have $17\frac{1}{2}$ per cent to pay on top of which there is the freight cost..."(2)

The company's submission itself was devoted to a request for the removal of the 10 p.c. duty on ethylene glycol; this is dealt with in the consideration of ethylene glycol under heading 29.04.

Representations were received from Radio Oil Refineries Limited, the other independent canner.(3) The company reported that it began making anti-freeze in 1953. The representation dealt largely with the need for duty-free entry of ethylene glycol; the spokesman for the company did indicate, however, that he would also like to have the existing duty applicable to anti-freeze under item 207d removed from anti-freeze imported in bulk, but continued at its present level on anti-freeze imported canned. He felt that with removal of the duties on ethylene glycol and bulk anti-freeze and continuation of the present protection on canned anti-freeze he could compete successfully.(4)

The spokesman for Radio Oil did not advance arguments or evidence in support of the continuation of the duty on canned anti-freeze, other than to say that its removal might create a hardship. He indicated that, given ethylene glycol at the same price, the cost of manufacturing anti-freeze was about the same in Canada as in the United States. The company's representations, in so far as they relate to ethylene glycol, are discussed under heading 29.04.

No submissions were received by the Board from contract canners, the automobile companies, other bulk buyers, other levels of trade or from Bradford-Penn Oil Limited, Toronto, Ontario, mentioned at the public hearing as the third independent canner.

Compound Catalysts

A catalyst is a substance which can initiate, or change the rate of, a chemical reaction without itself being permanently changed; it does not become a component of the product that results from the action it promotes. Only specific substances are catalysts for particular reactions. A catalyst often is present in the form of a liquid, a flour-like powder, a sponge-like mass or beads the size of a pea. The active ingredient of a catalyst preparation, which may be impregnated on a porous support, may be a pure metal, a metal salt or oxide, inorganic salt or oxide, or a combination of these. This part

(1) Transcript, Vol. 144, p. 21484

(2) Same, Vol. 144, p. 21526

(3) Same, Vol. 145, p. 21557

(4) Same, Vol. 145, p. 21609

of the report deals only with catalysts that are compounded products or preparations, not with those which are pure metals or separate, chemically defined products or other unmixed substances. The petroleum and chemical industries make use of the process of catalysis in their operations. The largest tonnage is used in the form of a fine, flour-like powder, but beads or pellets are also commercially important. The powder cracking catalyst is sometimes known as a "fluid cracking catalyst" because of its characteristic fluidity in use.

In the petroleum industry, catalysts promote the processes of alkylation, cracking, dehydrogenation, desulphurization, hydrogenation, isomerization, oxidation, polymerization, reforming and reduction. At the time of the hearing in 1963 there were 30 catalytic cracking units in petroleum refineries in Canada. Of these, 28 use the powder, or fluid-type catalyst in the cracking of petroleum. The remaining two units use the bead or pellet type catalyst, sometimes referred to as a "moving-bed" or a "fixed-bed" type; the pellet types of catalyst are not made in Canada but are imported from the U.S.A.

The powder catalyst is made in Canada by Davison Chemical Company Limited of Valleyfield, Quebec; the company is an affiliate of W.R. Grace and Company of the U.S.A. Davison Chemical was reported to be the only manufacturer of the petroleum cracking catalysts in Canada, but the company mentioned that there were producers of other types of catalysts. The other companies apparently include Englehard Industries of Canada Limited at Toronto, Ontario; Johnson Matthey and Mallory Limited at Toronto; Monsanto Canada Limited at Ville LaSalle, Quebec, and Vancouver, B.C., and Reichhold Chemicals (Canada) Limited at Ste. Therese de Blainville, Quebec.

Various petroleum cracking catalysts have different chemical compositions and are different from other types of catalysts. They are inorganic in nature and are composed of silica and alumina, or silica and magnesia or silica, alumina and magnesia. The other major raw materials include sodium silicate, sulphuric acid, alumina hydrate, carbon dioxide and ammonia. The manufacturing process also involves the use of high quality clay, the only raw material not obtained from Canadian sources. Davison Chemical indicated that prices of raw materials, on average, were noticeably higher in Canada than in the U.S.A.

In operations other than catalytic cracking, the petroleum refining industry uses other catalyst preparations frequently consisting of a precious metal (e.g., silver or platinum) deposited on a silica, alumina or other base. A wide variety of catalyst preparations is used in promoting chemical reactions, whether in a petroleum refinery or in a chemical plant.

A spokesman for Davison described the company's manufacturing process in the following terms:

"In the manufacture of silica-alumina catalysts, aluminum sulphate is produced by reacting alumina hydrate with sulphuric acid. Sodium silicate is acidulated with carbon dioxide and is then co-precipitated with the aluminum sulphate, in the presence of some ammonia. The resulting gel is then washed, re-slurried, and spray dried...The material is then given additional washing treatments to remove impurities and is

re-dried and stored for shipment. When manufacturing the clay modified catalyst, the clay is introduced in the proper quantities in the initial co-precipitation stage."(1)

Although information is not available to indicate in detail the market for compound catalysts in Canada, it apparently is in excess of \$7 million annually. The catalysts used in the petroleum industry account for the largest part of the known consumption although catalysts are used generally throughout other industries as well.

With respect to the petroleum catalyst preparations made by Davison Chemical Company, a spokesman for the company in 1963 noted that in the company's estimation, "cracking catalysts form over 50 per cent of the market for catalyst preparations in Canada. This is in value. We have displaced imports to \$3 million for cracking catalyst..."(2)

Of the types which the company makes, imports supply only a small part of the market.

Canadian Petrofina Limited has one of the two cracking units in Canada which require a pellet type catalyst. At the time of the hearing in January 1963, the company operated one refinery at Pointe-aux-Trembles, Quebec. The following data were provided by the company respecting its use of catalysts.(3)

<u>Types of Catalysts</u>	<u>Consumption</u>	<u>Price</u>
Natural "Moving Bed" Catalyst - being used in a Houdry Catalytic Cracking Unit:	1,500 tons	\$207.25 per net ton
Platinum Catalyst - being used for the "Reforming" of gasolines:	5,000 lb.	18.00 per lb.
Cobalt, Molybdenum Catalyst - being used for the Hydrosulphuri- zation of light fuels and gasolines:	10,000 lb.	1.05 per lb.
Phosphoric Acid Catalyst - being used for Polymerization of Propylenes and Butylenes (U.O.P.):	<u>70,000 lb.</u>	.27 per lb.
Total Consumption	1,542.5 tons \$430,275	

Sun Oil Company Limited, the other company that uses bead or pellet type catalysts in oil refining, indicated that its use of this type of catalyst was for about 600 tons a year, priced at about \$207 per ton, having a value, therefore, of nearly \$125,000.(4)

(1) Transcript, Vol. 115, p. 17271

(2) Same. Vol. 115, p. 17293

(3) Same, Vol. 115, p. 17311

(4) Same, Vol. 116, p. 17380

Consolidated Mining and Smelting Company of Canada Limited uses vanadium preparations as catalysts in the manufacture of sulphuric acid. These were said to be not available from Canadian manufacturers and the company reported its imports of this catalyst preparation in 1961 to be valued at \$40,000.(1)

Union Carbide Canada Limited uses a catalyst preparation consisting of silver on a silica base, in the manufacture of ethylene oxide. This preparation, which the company said is not made in Canada, is the only catalyst of interest to it under B.T.N. heading 38.19.(2)

Identified imports of catalyst preparations in 1963 and 1964 were valued at \$5.5 million; in 1964 this value represented imports of 10.7 million pounds, an average value of about 51 cents a pound. It is not known how many of these imports would be of preparations classified in B.T.N. 38.19

Davison Chemical Company noted that the selling price of its most important grade in Canada was 16 $\frac{1}{4}$ cents per pound; the selling price of similar material in the U.S.A. was 15 $\frac{3}{4}$ cents per pound. These prices compared with the average value of imports of 51 cents a pound, would confirm that imports are mainly of types not made by the principal Canadian manufacturer.

Compound Catalyst Imports, 1957-64

<u>Year</u>	<u>Petroleum Refining</u> \$'000	<u>Other</u> \$'000	<u>Total</u> \$'000
1957	6,465	875	7,340
1958	2,779	580	3,359
1959	2,691	605	3,296
1960	1,880	875	2,755
1961	2,297	970	3,267
1962	1,902	2,290	4,192
1963	2,765	2,800	5,565
1964	..	..	5,480

Country of Origin, of Imports, 1964

	<u>'000 lb.</u>	<u>\$'000</u>
U.K.	170	394
U.S.A.	10,447	4,956
Other	<u>93</u>	<u>130</u>
All Countries	10,710	5,480

Source: D.B.S., Trade of Canada, Imports; Dept. of Industry, Chemical Import Trends

(1) Transcript, Vol. 116, p. 17387

(2) Same, Vol. 116, p. 17392

Most of the imports (\$4.3 million in 1964) have been entered free of duty, principally under tariff item 263c. The duty collected on the \$1.2 million dutiable in 1964 was at an average rate of 19.2 p.c. under the M.F.N. Tariff; most of the dutiable imports appear to have been entered as preparations under tariff item 220a(i) at an M.F.N. rate of 20 p.c.

There are no known exports of compound catalysts, though there was said to be adequate capacity for the powder catalysts to make exports a possibility.

Tariff Considerations

Some catalyst preparations are named in the Customs Tariff, or the uses of them are specified, and they are allowed duty-free entry. For example, materials of a kind not produced in Canada for use only as catalysts in the refining of petroleum are free of duty under tariff item 263c; vanadium preparations for use as catalysts are duty-free under item 490a. Tariff item 490 provides for free entry of preparations of platinum for use in the manufacture or concentration of sulphuric acid and item 663b provides duty-free entry for articles which enter into the cost of the manufacture of fertilizers. Consolidated Mining and Smelting Company of Canada Limited (Cominco) noted its use of item 663b in connection with the importation of vanadium catalysts for use in the manufacture of sulphuric acid for use in making fertilizers. Tariff item 490 is part of Reference 120 in so far as it relates to chemicals and plastics.

Tariff item 875c, which provided for preparations composed of palladium and calcium carbonate, of a class or kind not made in Canada, for use only as catalysts in the production of antibiotics, duty-free, B.P. and at 5 p.c., M.F.N. expired January 31, 1965. Catalysts of a kind not made in Canada may be entered free of duty under tariff item 921, if for use in the manufacture of plastics.

Union Carbide Canada Limited imports its silver catalyst, used in making ethylene oxide, under tariff item 220a(i) at rates of 15 p.c., B.P., 20 p.c., M.F.N. The company said that it had tried to buy its catalyst in Canada but, being unable to do so, imported it from its parent company in the U.S.A. Catalysts more generally are dutiable under tariff item 220a(i) at rates of 15 p.c., B.P., 20 p.c., M.F.N., though import data indicate that only a fairly small volume is usually so entered.

Representations concerning catalysts were made by six companies and the Rubber Association of Canada. The only manufacturer of petroleum cracking catalysts in Canada making representation to the Board, Davison Chemical Company Limited, made a three-fold recommendation. First, the company proposed that all catalyst preparations be classified under an item worded like B.T.N. heading 38.19 and be accorded rates of 15 p.c., B.P., 20 p.c., M.F.N. Second, it proposed that a provision be included in the Tariff for free entry for the following catalyst preparations when of a class not made in Canada; an indicated use is shown in brackets.

Silver deposited on a silica base (oxidation of ethylene to ethylene oxide);
 Molybdenum oxide (petroleum desulphurization);
 Cobalt oxides and molybdenum oxides on an alumina base (petroleum desulphurization);
 Finely divided platinum on an alumina base (reforming);
 Phosphoric acid on a silica base (polymerization in refining);
 Vanadium oxide (oxidation for sulphuric acid or naphthalene);
 Platinum compounds on an alumina base (petroleum refining);
 Platinum compounds on a silica-alumina base (petroleum reforming);
 Molybdenum oxide and vanadium oxide (oxidation);
 and any other specifically defined catalyst preparation when of a class not made in Canada.

Third, Davison Chemical proposed that any catalyst preparation coming within these provisions be excepted from the current tariff items 208t, 220a(i), 263c, 490a, 663b, 711, 851 and 921. Davison Chemical agreed that the words "any specifically defined catalyst preparation when of a kind not made in Canada" would describe its intention. The company said that it made this recommendation:

"on the basis that if it is accepted it will provide a base for the future growth of this section of the chemical industry and will encourage manufacture in Canada of specific catalyst preparations as soon as there is a demand created for them."(1)

Some catalysts made by the company and described as "fluid bed silica-alumina cracking catalyst" are considered made in Canada and dutiable at 15 p.c., B.P., 20 p.c., M.F.N.

Davison Chemical did not indicate why it considered the proposed rates as either necessary or appropriate specifically for catalyst preparations that are made in Canada. The rates were those proposed generally by members of the chemical industry for products of Canadian manufacture.

Canadian Petrofina Limited proposed that, until the catalysts suitable for use in its refinery are manufactured in Canada, they should be free of duty.(2) The company imports them duty-free under tariff item 263c. Davison Chemical Company noted its agreement that a catalyst in bead or pellet form should be entered free of duty.

Sun Oil Company Limited, the other company that uses bead or pellet type catalysts in its petroleum refinery, recommended that tariff item 263c "be allowed to remain as presently published in the Customs Tariff, with no change in wording or duty provision."(3) This item provides for free entry under both Tariffs.

Imperial Oil Limited noted that no objections had been raised on the part of catalyst manufacturers to the retention of free entry

(1) Transcript, Vol. 115, p. 17274

(2) Same, Vol. 115, p. 17312

(3) Same, Vol. 116, p. 17378

for the kinds of catalyst not made in Canada, and that on the part of users no objection was made to the imposition of duties on the kind of catalyst made in Canada. "The only problem", the company said, "appears to be the precision with which a catalyst can be described if an attempt be made to identify each catalyst that will be eligible for listing on list three [not made in Canada] of the Industry Committee's proposal."⁽¹⁾ The brief went on to show that it would be hopeless to try to prepare a list of catalysts of a kind not made in Canada, and concluded:

"Therefore, we recommend that list three, for the chemicals under review, read 'Catalyst Preparations' B.P. 'free' and M.F.N. 'free' if Brussels Nomenclature be adopted or alternatively, that Tariff Item 263c be retained if the Tariff Board does not recommend the adoption of the Brussels Nomenclature."⁽²⁾

Imperial Oil, in making this proposal, was recommending free entry only for those catalysts which are not made in Canada, and indicated that its interest at present was encompassed by the provisions of tariff item 263c.

The British American Oil Company Limited noted that the proposal dealt only with those materials which are used as catalysts by the petroleum industry, and that the company had a substantial interest in tariff items 262 and 263c which provide duty-free entry for chemical compounds for removing water and salts from crude petroleum oils, and in materials of a kind not produced in Canada for use only as catalysts in the refining of petroleum. The company expressed its agreement that catalysts of a kind made in Canada be dutiable and catalysts of a kind not made in Canada be duty-free.⁽³⁾ However, it was not in agreement with the Industry Committee's proposal that all relevant catalysts of a kind not made in Canada be specifically listed in the Tariff. The company's objection was based on the large number of catalysts that would have to be named, the outdatedness of the list with the development of new catalysts and the apparent lack of logic in naming every type of catalyst except the one type made in Canada. The company recommended that item 263c be retained in the Tariff in its present form and with the present duty-free provisions. The brief continued:

"However, if the tariff is to be rearranged in accordance with the Brussels Nomenclature, we strongly recommend that the provisions of Item 263c be included...as follows:

		<u>Duty Rates</u>	
		B.P.	M.F.N.
"38.19	Materials of a kind not produced in Canada for use only as catalysts in refining of petroleum...	0	0

"The 38.19 heading rates would apply to catalysts of a kind made in Canada."⁽⁴⁾

(1) Transcript, Vol. 115, p. 17316

(2) Same, Vol. 115, p. 17317

(3) Same, Vol. 115, p. 17366

(4) Same, Vol. 115, p. 17367

The Consolidated Mining and Smelting Company of Canada Limited requested the retention of tariff item 490a which provides free entry for vanadium preparations for use as catalysts. The company said that these catalyst preparations are not made in Canada, and recommended the continuation of the existing Tariff as an aid in maintaining its competitive position.

As noted above, Union Carbide Canada Limited uses silver on a silica or on an alumina base as a catalyst in the production of ethylene oxide; it is the only catalyst in which the company had an interest under B.T.N. heading 38.19 and the company expressed the view that it probably was the only company using the particular catalyst. It is imported under tariff item 220a(i) at rates of 15 p.c., B.P., 20 p.c., M.F.N. The company requested that this catalyst preparation be entered free of duty until it is made in Canada.

Peter Spence and Sons, Limited manufactures catalysts in England for the petroleum, petrochemical, gas generating, steel and chemical industries. The company said that the Industry Committee's recommendation for rates of 15 p.c., B.P., 20 p.c., M.F.N., for all products other than those accorded exception rates would not be in the best interests of Canadian users of catalysts. It said that a number of catalysts are accorded exception rates in the Committee's list "but there is no provision made for an even greater number of catalyst preparations which are now in commercial use or under development including most of those manufactured by Peter Spence & Sons Ltd." (1) Further, the company's brief stated:

"It is submitted that catalysts for petroleum refining should continue to be admitted into Canada free of duty and the existing British Preferential margin of 15% should be maintained on all other industrial catalyst." (2)

A spokesman for the Industry Committee noted that the reference by Peter Spence and Sons to a British preferential margin of 15 per cent seemed to assume, erroneously, that catalysts of heading 38.19 enter Canada under tariff item 208t. The preferential margin under item 220a(i) is five percentage points and some catalyst preparations are admitted free of duty under both Tariffs.

The Rubber Association of Canada noted its interest in catalysts used by the rubber industry in the manufacture of goods of rubber or plastics. The Association pointed out that the materials used by its members are imported mainly under tariff items 208t, 220a, 711 and 921, and registered objection to the Industry Committee's proposal that "products and preparations of the types mentioned above, without any exceptions, be made dutiable at heading rates of B.P. - 15%; M.F.N. - 20%." (3)

(1) Transcript, Vol. 116, p. 17407

(2) Same, Vol. 116, p. 17408

(3) Same, Vol. 116, p. 17477

Vinyl Resin Stabilizer Preparations

Although stabilizers have many uses, the only stabilizer preparations on which the Board received representations under heading 38.19 were those for use with vinyl resins.

A vinyl resin stabilizer is a product which retards the deterioration of plastic materials that would occur under such influences as heat and light. A number of these stabilizers in the form of separate chemicals were discussed under B.T.N. headings 29.14 and 29.15; this part of the report is concerned with mixtures or blends of these chemically defined stabilizers.

There are many separate formulations of stabilizer blends, probably in excess of 400. While they are competitive in a general way, in that one might be substituted to some extent for another, the formulations tend to be specially designed to meet particular applications.

Three families of stabilizer preparations currently are reported to be made in Canada by eight known firms as follows:

- (1) Lead derivatives such as dibasic lead stearate, carbonate of lead, tribasic sulphate and lead phthalate are made by Canadian Titanium Pigments, Ltd., McArthur, Irwin Limited, Carter White Lead Company of Canada Ltd., all of Montreal, and Nuodex Products of Canada Ltd. of Toronto.
- (2) Barium, cadmium and zinc soaps and organic phosphate combinations are made by Nuodex Products of Canada Ltd., Ferro Enamels (Canada) Ltd., of Oakville and Argus Chemical Company of Guelph. Witco Chemical Company Canada Ltd. of Toronto produces cadmium stearate.
- (3) Organotin mercaptide types are made by Argus Chemical Company and M & T Products of Canada Ltd. of Hamilton.

In addition the market is supplied with other stabilizer preparations, a number of which are listed in the table below showing imports of stabilizer preparations. The tin (stannous) type are not made in Canada.

An important exporter to Canada is Advance Solvents and Chemical Division of Carlisle Chemical Works Inc., a manufacturer of stabilizers in the United States. Argus Chemical Corporation of New York and other companies in the U.S.A. also export to Canada.

The selection of a particular stabilizer "depends on an evaluation of many factors - the technical requirements of the finished product, price, ease of processing, availability, familiarity with the stabilizer etc."⁽¹⁾ One estimate was that stabilizers represent about 8 per cent of the cost of materials in plastics formulations.

(1) Transcript, Vol. 116, p. 17507

The lead-based and non-lead based stabilizers compete in some uses but there were uses for which one or the other type was preferred. In electrical sheathing insulation, for example, a spokesman for Canadian Titanium Pigments Limited indicated that the lead-based were clearly preferred.

Ferro Enamels (Canada) Limited supported this view in the following terms:

"in wire coating, and where you are concerned with dielectric properties lead stabilizers fill the bill in the sense that they are not subject to leaching. Lead stabilizers in this field are the best in my estimation, and the barium, cadmium, zinc stabilizers that we make don't compete except, for...a specific purpose..."⁽¹⁾

Ferro Enamels produces many different formulations, but not lead or tin types, in the form of powders, liquids and pastes and resells other stabilizers imported from its U.S. parent; its Canadian formulations comprised, in 1963, some 75 per cent of its sales. The company reported that it made about 35 stabilizers in Canada and had available from its U.S. affiliate about 150 stabilizer formulae. The company said, "we made a complete range of stabilizers to meet any requirements of Canadian vinyl processors..."⁽²⁾

Ferro Enamels' sales were valued at \$25,000 in 1960, \$48,000 in 1961 and \$118,000 in 1962.⁽³⁾

The company claimed that raw materials accounted for approximately 75 per cent of total manufacturing cost; a considerable portion of these, not available from Canadian production, had to be imported. Raw material costs were said to be 35 per cent higher to Ferro Enamels than to U.S. producers.

On the other hand, most of the raw materials for the lead-based stabilizers manufactured by Canadian Titanium Pigments are of Canadian origin.

The price of stabilizers, in 45 gallon drum lots, was said to range from 45 cents per pound to \$1.49 per pound, depending upon the particular stabilizer, but to average between 70 and 75 cents per pound.

At the time of the hearing in 1963 Canadian Titanium Pigments claimed to supply 80 per cent of the market for lead-based stabilizers and noted that a good portion of the balance was being supplied by McArthur, Irwin. Imports of these types were estimated by Canadian Titanium Pigments to supply less than five per cent of the market.⁽⁴⁾ The company recorded agreement with a trade estimate of the market for this type, amounting to some 900,000 pounds annually, valued at

(1) Transcript, Vol. 174, p. 28354-5

(2) Same, Vol. 174, p. 28351

(3) Same, Vol. 173, p. 28347

(4) Same, Vol. 116, p. 17511

\$300,000 to \$350,000. It was estimated that there were about 40 users of these types of stabilizers; almost all located in Ontario and Quebec.

Although only small amounts of stabilizer preparations are required in any one product, Canadian Titanium Pigments indicated that some stabilizer material is used in practically all products made by compounders of polyvinyl chloride resins.

Because of the large quantities of polyvinyl resins used in Canada and the rapid growth in use, the market for lead-based stabilizers is a substantial portion of the total market for stabilizers, possibly accounting for close to 25 per cent.

Imports of vinyl resin stabilizer preparations are shown in the following table.

Imports of Stabilizers for Vinyl Resins, 1961-63			
Type	1961 \$	1962 \$	1963 \$
Barium	7,451	7,404	..
Barium-cadmium	172,623	264,057	..
Barium-cadmium-zinc	10,809	2,040	..
Barium-zinc	14,220	12,357	..
Cadmium	27,813	63,268	..
Chelating agents		45,102	..
Epoxy-type	1,543	6,076	..
Organic type	7,514	147,371	..
Organotin	50,845	41,500	..
Stannous type		47,218	..
Zinc Complex	19,614	12,798	..
Other	377,568	250,809	..
Total	690,000	900,000	830,000

Source: Department of Industry, Chemical Import Trends and Import Studies

On the basis of information available to the Board, an estimate of the total Canadian market for vinyl resin stabilizer preparations in 1962 was derived, indicating a value in excess of \$1.5 million. Probably more than 55 per cent of this market was supplied by imports in that year, though the portion of the market supplied by imports appears to have declined since that time.

Tariff Considerations

Imports of vinyl resin stabilizer preparations are dutiable under tariff item 220a(i) at rates of 15 p.c., B.P., 20 p.c., M.F.N. Stabilizers of a kind not made in Canada and for use in the manufacture of plastics may be entered free of duty under tariff item 921.

Canadian Titanium Pigments Limited recommended rates of 15 p.c., B.P., 20 p.c., M.F.N. for lead based stabilizers, "the same rates as have been recommended for various specific chemicals useful for vinyl stabilizers, (B.T.N. 28.38, 29.14, 29.15) as they have come up during the course of hearings on this Reference." (1) The company proposed these rates of duty, even though it had 80 per cent of the market for its type of stabilizer, as protection against events in the future which it could not foresee. The company noted that it had been able to supplant most of the imported material even though some may be entered duty-free under tariff item 921. (2) The company also said that when it began to supply the market, it did not increase the price of the stabilizer and that, allowing for the inclusion of freight in the quoted Canadian prices, they are equivalent to prices in the U.S.A.

Ferro Enamels (Canada) Limited proposed rates of 15 p.c., B.P., 20 p.c., M.F.N., for "stabilizers for vinyl type synthetic resins, except those ruled as of a kind not made in Canada." (3) This submission was made in full at a later hearing dealing with end-use item 921; so far as the proposal was for heading 38.19, it was limited to discussion of kinds made in Canada.

At the hearing on end-use item 921, the company amended the proposal with respect to stabilizers not made in Canada. The company said:

"In our original proposal, we proposed that the recommended tariff rates of 15 per cent B.P. - 20 per cent M.F.N. apply to stabilizers for vinyl type resins except those ruled as of a kind not made in Canada. We have subsequently concluded that it would be impossible to administer such a tariff effectively, as it would be next to impossible to distinguish kinds made in Canada from those not made in this country... Therefore, to give a clear-cut tariff on stabilizers that can be effectively administered, give adequate protection on Canadian-made products and encourage manufacturers to produce all kinds in this country, we recommend that a tariff item be set up under B.T.N. heading 38.19 (which includes 'stabilizing preparations' as an example) reading as follows:
 'Stabilizers for vinyl type synthetic resins-
 B.P. 15 per cent, M.F.N. 20 per cent, except tin-bearing stabilizers - B.P. 0 per cent, M.F.N. 0 per cent.'" (4)

Ferro Enamels suggested that the tin-bearing stabilizers be granted duty-free entry until such time as they are of a class made in Canada.

In explaining its position, Ferro Enamels said that tariff protection is required to enable it to compete economically with large volume producers in the U.S.A. who, unlike Canadian manufacturers, are able to obtain their raw materials domestically and therefore, need not

(1) Transcript, Vol. 116, p. 17508

(2) Same, Vol. 116, p. 17509

(3) Same, Vol. 116, p. 17519

(4) Same, Vol. 173, p. 28346

pay import duties on them. The company wants the same protection on its products as the suppliers of raw materials have so that it can obtain a fair portion of the Canadian market and maintain its current price levels. Ferro Enamels said that, under the protection of a tariff, it would raise its prices as little as possible, hoping instead that the tariff would enable it to secure a larger share of the market, thus reducing its costs of production. Its spokesman said that the company's operation could be profitable if: the tariff on some of the raw materials were eliminated, a higher tariff were placed on its product and a higher volume of production was achieved.

Nuodex Products of Canada Limited, also a manufacturer of vinyl stabilizers, withdrew its submission on stabilizers, in part because of the difficulty of assessing the implications of a made-in-Canada provision.(1)

In the hearing on end-use tariff item 921, McArthur, Irwin Limited proposed the exclusion from item 921 of lead-based stabilizers. The company said that the purpose of this item could be achieved without harming Canadian producers by substituting for it a list of those stabilizers which would receive lower rates of duty because they were not made in Canada and not competitive with Canadian-made products. It recommended that, if the Board should decide to continue an end-use item such as item 921, "it should require that the products be spelled out by name and be qualified with a 'when of a class not made in Canada'. Otherwise, you will perpetuate the problem of free entry that we have had with products that may not be identical with ours chemically, but are directly competitive in use."(2)

In effect, therefore, those manufacturers of stabilizers for vinyl resins that made submissions before the Board felt that they were able to supply all the needs of Canadian plastics manufacturers but they wanted protection from imports of types of stabilizers made in Canada. This protection, they hoped, would increase their share of the market, thereby decreasing costs of production; it would protect them against unforeseen future conditions that tended to increase import competition.

During the hearing on plastics in 1963, the following PVC Fabricators of Quebec made a proposal respecting vinyl resin stabilizers dutiable under tariff item 921:

American Biltrite Rubber Co. of Canada Ltd.
 Armstrong Cork (Canada) Ltd.
 Bemis Associates of Canada Ltd.
 Building Products Ltd.
 Concord Rubber Ltd.
 Consumer Glove Co. Ltd.
 Daly & Morin Ltd.
 Edmont Canada Ltd.
 Evertex Co. Ltd.
 National Vintex Corp.
 Plasticana Co. Ltd.
 Service Backing & Coating Corp.

(1) Transcript, Vol. 173, p. 28402; letter, June 26, 1963
 (2) Same, Vol. 174, p. 28484

The PVC Fabricators of Quebec proposed:

"That tariff item 921 remain in its present form to allow the continuance of duty-free entry of those raw materials now under this item which are not now produced in Canada. Under this tariff item...stabilizers of a type not made in Canada are available, which permit us to maintain the specifications for our finished articles. Until a complete range of suitable...stabilizers are available from domestic sources of supply at prices commensurate to those prevailing in world markets it will be essential that the present tariff item be continued."(1)

Carlisle Chemical Works Inc. based its proposal for duty-free entry for stabilizers that are not made in Canada on the inability of the Canadian producers to supply a complete range of stabilizers to domestic plastics manufacturers. It noted that stabilizers on the average represent about 8 per cent of the cost of materials used in plastic compositions and suggested that a 20 per cent increase in the cost of stabilizer preparations through the imposition of duties is a matter of serious moment to the secondary manufacturer.

Carlisle Chemical Works Inc. recommended that tariff item 921 remain unchanged to allow duty-free entry of stabilizers of a kind not made in Canada in order that secondary manufacturers might have access to stabilizers of a type not made in Canada; the company considered it essential that the item be continued until a complete range of suitable stabilizers are available from domestic sources all supplied at prices commensurate to those prevailing on world markets. In supporting its proposal, the company said:

"The secondary manufacturer of plastics has a far higher labour content in his products than does the primary resin producer and therefore the well being of his interest is of greater significance to the Canadian economy as a whole. He must be able to have access at reasonable prices to materials which he cannot obtain in Canada or he cannot be competitive with conventional materials or, even more important, the finished imported products."(2)

The company criticized what it called the static "list 3 concept", saying that free entry or low rates of duty only for a static list of stabilizers deemed to be not made in Canada would deprive Canadian plastics manufacturers of similar access to new stabilizers continually being developed by a dynamic and changing industry; some means was needed that would permit new products free entry with a minimum of delay. It was stressed, too, that the problem of determining whether a particular stabilizer is of a type made in Canada is difficult because, for example, the chemical structure of a stabilizer does not indicate its interchangeability with another.

The spokesman for Argus Chemical Corporation of New York, U.S.A., a large manufacturer of stabilizers in that country, affirmed the importance of the service and advice provided by a seller of

(1) Transcript, Vol. 154, p. 22883

(2) Same, Vol. 173, p. 28411

stabilizers, and the desirability for a user to be able to obtain the particular stabilizer he requires from his supplier.

The Rubber Association of Canada listed stabilizer preparations as products under heading 38.19 in which its members had an interest as consumers. In general, the Association wanted no increases in the rates of duty on products used by its members because of the possibility of the increased costs of production.(1)

Rubber Antioxidant Preparations

Rubber antioxidants are a class of materials added to vulcanized rubber to retard oxidation and deterioration.

Rubber antioxidants which are single, chemically-defined products have been discussed in this report under B.T.N. heading 29.35. At the time of the hearing on that heading, in March 1962, it was disclosed that some of the chemicals used as antioxidants for rubber, when more highly refined, can also be used as antioxidants in animal feeds. In animal feeds, antioxidants protect fats, oils, carotene and vitamin A from deterioration through oxidation; the specifications for feed grade material differ from those for rubber antioxidants. The spokesman for Monsanto Canada Limited said:

"The process for the feed additive is the same as the process for the rubber antioxidant, to a point, and then in the case of the feed additive the purification step follows the point at which normally the process is over, or finished for rubber antioxidant application. It is a further purification of a rubber antioxidant. This is the only difference in the two."(2)

Rubber antioxidant preparations of B.T.N. heading 38.19 are blends of two or more antioxidants, reaction products of undefined chemical structure, or blends of antioxidants with diluents. Monsanto Canada Limited listed the following as examples of blends and reaction products:(3)

1. Blends:

N,N'-diphenyl paraphenylene diamine and phenyl beta naphthylamine.
N,N'-diphenyl paraphenylene diamine and 6-dodecyl-1,2-dihydro-2,2,4-trimethylquinoline.
Phenyl beta naphthylamine, dimethoxy, diphenylamine and N,N'-diphenyl paraphenylene diamine.

2. Reaction products:

Polymerized 1,2-dihydro-2,2,4-trimethylquinoline
Diphenylamine - acetone reaction product
Alkylated diphenylamines

(1) Transcript, Vol. 116, p. 17477

(2) Same, Vol. 73, p. 11200

(3) Same, Vol. 116, p. 17439

The brief presented by Naugatuck Chemicals Division of Dominion Rubber Company Limited grouped its rubber chemical preparations of heading 38.19 into 7 classes; of these, 5 groups are anti-oxidants.⁽¹⁾

- I Diphenylamine - acetone reaction products: The following two products are made in Canada only by Naugatuck; the company began manufacture of Aminox and BLE in 1944; it also makes one of the raw materials, diphenylamine.
- a) Aminox: made by the catalytic reaction of diphenylamine (B.T.N. 29.22) and acetone. This used as a general purpose antioxidant for natural and synthetic rubbers. Its selling price was 62 cents per pound in ton lots delivered in Ontario and Quebec.
 - b) BLE: made by the catalytic autoclave reaction of diphenylamine (BTN 29.22) and acetone. This is used as an antioxidant in natural and synthetic rubbers and as a stabilizer in SBR types of synthetic rubber. Its selling price at the time of the hearing was 62 cents per pound in ton lots delivered in Ontario and Quebec.
- II Flexamine: A mixture prepared by melting together Aminox and N,N'-diphenyl-p-phenylene diamine (BTN 29.22). The latter chemical is also known as JZF. This is a superflexing antioxidant used to improve resistance to flex cracking in rubber; it is often used with BLE. The selling price at the time of the hearing was 85 cents per pound in ton lots delivered in Ontario and Quebec.
- Flexamine is made in Canada only by Naugatuck, as are the two component raw materials.
- III Laurex (zinc Laurate): This is used as an accelerator, activator and plasticizer in rubber manufacture. It is not an anti-oxidant. Although properly classified in BTN Heading 38.19, it is frequently confused with pure zinc laurate classified in heading 29.14. It is discussed in this report under heading 29.14.
- IV Naugawhite (Methylene-bis-nonyl-p-cresol)
This is made by first reacting p-cresol and nonenes; the product of this reaction is reacted with paraformaldehyde. It is a general purpose antioxidant which does not discolour or stain; it protects rubber against light, heat, and oxygen and it is used in whitewall tires.

It is also used as a stabilizer in the manufacture of acrylonitrile-type synthetic rubber. The selling price at the time of the hearing was 62 cents per pound in ton lots delivered in Ontario and Quebec. It is made in Canada only by Naugatuck Chemicals from nonenes purchased in Canada and from imported p-cresol and paraformaldehyde.

⁽¹⁾ Transcript, Vol. 116, p. 17449-56

- V Naugoil: this is prepared by mixing dicresyl disulphide, tall oil, wood rosin and process oil (B.T.N. 38.15). Dicresyl disulphide (B.T.N. 29.31) is the product of the reaction between cresylic acid and sulphur monochloride. Naugoil, made in Canada only by Naugatuck Chemicals, is used as a plasticizing and reclaiming oil for rubber. It is not an antioxidant. Its selling price at the time of the hearing was 19 cents per pound, delivered in Ontario and Quebec.

VI Alkylated Diphenylamines

- a) Octamine: prepared by the catalytic reaction between diphenylamine (BTN 29.22) and diisobutylene. It is a non-staining general purpose antioxidant; the selling price at the time of the hearing was 62 cents per pound in ton lots delivered in Ontario and Quebec. It is made in Canada only by Naugatuck Chemicals.
- b) Polylite: prepared by the catalytic reaction of diphenylamine with nonenes. It is a non-staining antioxidant for natural and synthetic rubber. The selling price at the time of the hearing was 62 cents per pound in ton lots delivered in Ontario and Quebec. It is made in Canada only by Naugatuck Chemicals. These products have been manufactured by Naugatuck since 1951.

VII Polygard (Alkylated aryl phosphite mixture)

This product is produced by the reaction of a mixture of nonyl- and dinonyl-phenols with phosphorous trichloride and is employed as a non-discolouring and non-staining antioxidant and stabilizer for synthetic rubber during drying operations and subsequent storage. Naugatuck, the only Canadian producer, has manufactured the product since 1953. At the time of the hearing, its selling price was 62 cents per lb. in ton lots delivered in Ontario and Quebec.

Monsanto Canada Limited said that possibly only 15 per cent of all antioxidants used are blended products of heading 38.19; Monsanto does not produce the blended products, although it has the facilities to do so should demand justify manufacture. Naugatuck Chemicals, however, as noted above, does produce the blends and indicated that imports probably supplied something less than one-half of the Canadian market for antioxidants of similar or competitive types to those of the company's manufacture.⁽¹⁾

Available import data for antioxidants, single chemicals and blends, are contained in the following table. Most imports come from the United States but smaller amounts come from the United Kingdom, Germany and Holland. More detailed information for six months of 1960 indicate that most imports probably are single chemicals.

⁽¹⁾ Transcript, Vol. 116, p. 17466

Rubber Antioxidant Imports, 1959-63

\$'000

1959	1,230
1960	1,450
1961	1,145
1962	1,700
1963	1,835

Imports by Type, 1959 and 1960

	<u>1959</u>	<u>1960</u>
	<u>\$'000</u>	
Blends	80	180
Alkylated Diphenylamines	140	230
Butyl Cresol Sulphide	50	75
Phenyl Alpha Naphthylamine	55	35
Phenyl Beta Naphthylamine	50	50
Styrenated Phenol Type	135	170
Other	<u>720</u>	<u>710</u>
Total	1,235	1,450

Source: Department of Industry, Chemical Import Trends

If, as Naugatuck Chemicals suggested, imports of rubber antioxidants in 1962 or 1963 were supplying something less than one-half of Canadian consumption of competitive products, total consumption at that time apparently was at least \$4 million, indicating production of antioxidants in Canada of perhaps \$2 million or more. Available published data on the consumption of antioxidants does not account for the total arrived at in the above estimate, in part perhaps because of captive use.

Reported Consumption of Rubber Antioxidants, 1957-63

	<u>'000 lb.</u>	<u>\$'000</u>	<u>\$/lb.</u>
1957	2,553	1,539	.60
1958	2,741	1,540	.56
1959	3,885	1,893	.49
1960	3,123	1,601	.51
1961	3,588	1,968	.55
1962	4,113	2,297	.56
1963	4,710	2,788	.59

Source: D.B.S., Cat. No. 33-206

Tariff Considerations

These substances are dutiable under tariff item 220a(i) at rates of 15 p.c., B.P., 20 p.c., M.F.N. When for use in the manufacture of synthetic rubber they are free of duty under item 851. Monsanto said that polymerized 1,2-dihydro-2,2,4-trimethyl quinoline was reported to have been imported free of duty under tariff item 901(a)9 and imported under item 208t at rates of Free, B.P. and 15 p.c., M.F.N. Naugatuck noted the possibility of imports under item 711 at rates of 15 p.c., B.P., 20 p.c., M.F.N. Some forms of the product may be classified by B.T.N. heading 39.02.

Monsanto Canada Limited recommended that rubber antioxidant preparations be classified according to B.T.N. heading 38.19 and be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N. without exception. In support of this proposal, the company said:

"We believe it to be essential that a tariff rate of 15% B.P. and 20% M.F.N., the same level as that recommended for antioxidants under Brussels 29.22 and 29.35, be applied in order that the protection afforded to antioxidant chemicals not be nullified. In addition, it would appear to us that determination of made-in-Canada status would pose very difficult administrative problems. In view of the broad range of competitive products already produced by Canadian manufacturers, it is our contention that antioxidants and antiozinants which are not chemically defined and which are not made in Canada should be dutiable at the rate recommended for those that are made, namely, 15% B.P. and 20 p.c., M.F.N.(1)

Naugatuck Chemicals recommended that the rates for the seven groups of chemicals mentioned in its brief be 15 p.c., B.P., 20 p.c., M.F.N. In support of its proposal, the company said:

"Naugatuck Chemicals reaffirms its basic position stated on all occasions previously: 'we could not maintain our position as a manufacturer of chemicals in Canada if placed under a competitive disadvantage caused by higher duty rates on raw materials, unless we received commensurate protection for the products which we make'."(2)

This statement referred to possible increases in rates of duty on raw materials resulting from other proposals before the Board and the company's proposal for offsetting increases in protection on products of its manufacture. If there were free entry of raw materials, the company generally would not object to free entry of the final product.(3)

(1) Transcript, Vol. 116, p. 17440

(2) Same, Vol. 116, p. 17457

(3) Same, Vol. 116, p. 17468

Polymer Corporation, at the time of the hearing on heading 29.22, expressed interest in duty-free entry for alkylated diphenylamine and diphenylamine-acetone reaction products. The company said: "we consider it essential the tariff provisions in respect of materials for use in the manufacture of synthetic rubber, now contained in item 851, be continued..."(1)

The Rubber Association expressed opposition to the recommendation of Monsanto Canada Limited "that all rubber antioxidants and/or antiozonants falling under Brussels...heading 38.19... be made dutiable at the rates of B.P. 15 per cent; M.F.N. 20 per cent, regardless of whether made in Canada or not made in Canada."(2) The Association also objected to the Industry Committee's proposal to the extent that it would increase the rates of duty for antioxidants at present entered under tariff items 208t and 921.

In its submission on tariff item 208t, the Association requested duty-free entry for the following antioxidants classified to this heading when they are not made in Canada.(3)

Mixture of octylated diphenylamines
Mixture of diaryl-p-phenylene diamines
Mixture of phenyl-beta naphthylamine,
 4,4'-dimethoxydiphenylamine and
 N,N'-diphenyl-para-phenylene diamine
Phenyl-beta-naphthylamine-acetone reaction product
Styrenated phenol

Nopco Chemical Canada Limited, a manufacturer of antioxidants, made the following statement respecting products of headings 38.14 and 38.19:

"The antioxidants and antioxidant preparations, the corrosion inhibitors and some other like products were discussed by us fairly extensively in our presentation under B.N. 38.14 under which heading of course they are specifically directed to end-use in petroleum products. B.N. 38.19 is broader in its coverage of these items in that they are covered by this heading if not elsewhere specified or included. We feel that the same treatment should be given for this catch-all category so that the same duty treatment will be obtained as elsewhere requested. Our request for rates of 15% B.P. and 20% M.F.N... is directed to that end."(4)

(1) Transcript, Vol. 68, p. 10420

(2) Same, Vol. 73, p. 11173

(3) Same, Vol. 165, p. 24369

(4) Same, Vol. 117, p. 17554

The companies that proposed rates of 15 p.c., B.P., 20 p.c., M.F.N. did not indicate why these rates were considered to be necessary specifically for antioxidants and, in particular, why a British preferential rate of 15 p.c. was necessary. Rates of 15 p.c., B.P., 20 p.c., M.F.N. were proposed generally by producers to apply uniformly to chemicals and allied products under Reference 120.

Plasticizer Preparations

A plasticizer is a product which improves the characteristics of synthetic resins, for example, to facilitate compounding and to make them more flexible, stronger or more resistant to water or corrosion. Plasticizers of B.T.N. heading 38.19 are blends of the individual chemical plasticizers classified in B.T.N. Chapter 29. It is the practice to make use of blends of plasticizers, and as noted by Monsanto Canada Limited, some companies buy the plasticizers already blended while others buy separate plasticizers and perform their own blending. The company said, "A very substantial portion of Monsanto's total sales of plasticizers is in the form of blends."⁽¹⁾ The following tables show available data on consumption and imports of plasticizers for some uses in Canada.

Consumption of Plasticizers, by Industry,
1961, 1962 and 1963

<u>Industry</u>	<u>1961</u>		<u>1962</u>		<u>1963</u>	
	lb. '000	\$ '000	lb. '000	\$ '000	lb. '000	\$ '000
Rubber products	16,353	2,536	18,267	2,788	21,245	3,392
Miscellaneous textiles	5,557	1,501	8,342	2,115	8,396	2,048
Plastics and synthetic resins	<u>2,163</u>	<u>530</u>	<u>3,748</u>	<u>901</u>	<u>5,869</u>	<u>1,021</u>
Total of above	24,074	4,567	30,357	5,804	35,510	6,461

Source: D.B.S., various publications

⁽¹⁾ Transcript, Vol. 116, p. 17481

Imports of Rubber Plasticizers, 1959-63

<u>Year</u>	<u>\$'000</u>
1959	300
1960	570
1961	755
1962	1,370
1963	785

Source: Department of Industry, Chemical Import Trends

Blends of plasticizers relevant to Reference 120 may be imported under tariff items 220a(i) and 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. and under tariff item 208t at Free, B.P., 15 p.c., M.F.N. Tariff item 220a(i) covers chemical preparations compounded of more than one substance, n.o.p. Some plasticizers were said to be entered free of duty under tariff item 921 as being of a kind not produced in Canada and for use in making synthetic resins and plastics. Monsanto expressed the view that substantial imports of blends are entered free of duty because the particular blend was not made in Canada even though some of the individual plasticizers might be. The company estimated that the imported blends contained plasticizers of a kind made in Canada to the value of \$250,000. Other producers of plasticizers in Canada were said to be Shawinigan Chemicals Limited, Howards and Sons (Canada) Limited, Canadian General Electric Company Limited, Rohm and Haas Company of Canada Limited and W.C. Hardisty and Company of Canada Limited. Capacity was said to be adequate to supply the Canadian market. Prices were reported to be very close to U.S. prices and profit levels were said to be low.

Monsanto Canada Limited manufactures a broad range of plasticizers at its Montreal plant and the company made a submission on a number of single products under B.T.N. heading 29.15 where the submission is discussed in this report, together with information on the market and uses.

Monsanto recommended that all blends of plasticizers, regardless of composition, be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N., under B.T.N. heading 38.19. The company based its recommendation on the desirability of applying to blends the same rates that apply to single chemical plasticizers produced in Canada. It said further that, since all possible plasticizer blends are, or could be, made in Canada, there is no basis for exceptional treatment for any particular blend. The company pointed out that the recommended treatment "would eliminate the anomaly now existing whereby plasticizers of a kind made in Canada may be imported duty-free."⁽¹⁾ The possibility of lower production costs resulting from a larger market was noted and it was suggested that the proposed rates were unlikely to have adverse effects on Canadian consumers because of the highly competitive nature of the plasticizer market in Canada.

(1) Transcript, Vol. 116, p. 17482

The Rubber Association of Canada objected to the proposal that, without any exceptions, products and preparations used as accelerators, anti-oxidants, blowing agents, plasticizers, retarders, stabilizers and catalysts for rubber and synthetic resins and plastics be dutiable at rates of 15 p.c., B.P., 20 p.c., M.F.N. It said the implementation of such a proposal would cause a considerable increase in the costs of chemicals used in substantial quantities by the rubber industry.(1)

A product classified in B.T.N. heading 38.19 and which might be considered a plasticizer within this part of the report was discussed by the Dewey and Almy Chemical Division of W.R. Grace and Company of Canada Limited at the hearing on heading 38.05; the product is sold under the trade name "Dry Airlon". It is the drum dried skimmings from sulphate black liquor, the liquor being a residue from the sulphate process of making paper. Dry Airlon is used by cement manufacturers to impart air entraining and plasticizing qualities to masonry cement. It is not made in Canada and imports in 1961 were valued at \$42,000.(2) Dry Airlon was said to have been free of duty at one time under tariff item 585a, "Tall oil, tall oil pitch and blended tall oil and tall oil pitch"; however it was reclassified in 1958 as a soap under item 228(ii), dutiable at 15 p.c., B.P., 20 p.c., M.F.N.

Dewey and Almy Chemical Division noted that the tall oil manufactured from black liquor skimmings is free of duty under tariff item 585a while Dry Airlon, which is the black liquor skimmings in drum dried form, is subject to duties under item 228(ii). The company said, however, that tall oil cannot be made from the drum dried black liquor skimmings; it requires black liquor skimmings in liquid form. The company contended that:

"it is inequitable that a base raw material should be dutiable when a product manufactured from this raw material (tall oil) is allowed entry duty-free. This is our basis for the request that Dry Airlon either be included in 585a or a new item be created for Sulphate Black Liquor Skimmings and thereby remove this inequity on this product... Should the Board feel that this material is not eligible for entry under item 585a, we suggest that the following wording be used in establishing the new item number.

'Sulphate black liquor skimmings, dried, ground or not ground, for use in the manufacture of cement'. "(3)

The company proposed duty-free entry under the new item.

Dewey and Almy had made its original submission on Dry Airlon under B.T.N. heading 38.05. At the later hearing on heading 38.19, where this product appears to be correctly classified, the company proposed that "Dry Airlon be admitted either under an end-use item, for use in the manufacture of cement, or an exception item under Brussels Nomenclature 38.19, either of which would provide for free entry under British Preferential and Most Favoured Nation Tariff."(4)

(1) Transcript, Vol. 116, p. 17477

(2) Same, Vol. 104, p. 15808

(3) Same, Vol. 104, p. 15808-9

(4) Same, Vol. 117, p. 17553

At a still later hearing, in May 1963, Dewey and Almy said that tariff item 585b should be reinstated with amendments to allow sulphate black liquor skimmings free entry regardless of its end-use.(1)

Two products, of the trade names Laurex and Naugoil, having plasticizing properties were brought to the attention of the Board by Naugatuck Chemicals Division of Dominion Rubber Limited. They have been discussed in this report with the company's other chemicals of B.T.N. heading 38.19 that are used in making rubber.

Reference was made at the hearing to tariff item 269c which provides duty-free entry for reclaiming agents or plasticizers of petroleum origin, for the reclaiming or plasticizing of rubber. This item is not part of Reference 120 and the view was expressed that if it remains in the Tariff, it would attract products otherwise classified under heading 38.19.

A group of fabricators of products from polyvinyl chloride, all located in the province of Quebec, made a proposal in May 1963 in support of continuation of the free entry of plasticizers as provided under item 921. The brief said:

"Under this tariff item, plasticizers and stabilizers of a type not made in Canada are available, which permit us to maintain the specifications for our finished articles. Until a complete range of suitable plasticizers and stabilizers are available from domestic sources of supply at prices commensurate to those prevailing on world markets it will be essential that the present tariff item be continued."(2)

Pennsylvania Industrial Chemical Corporation, an exporter from the U.S.A. to Canada of aromatic plasticizers, requested that these products remain classified under tariff item 269c, free of duty, until such time as they are made in Canada.(3) Tariff item 269c refers to reclaiming agents or plasticizing agents, of petroleum origin, for the reclaiming of plasticizing of rubber; it is not within the terms of Reference 120. These products were brought to the Board's attention in March 1963 at the time of the hearing on B.T.N. heading 39.02.

Mixed Alkyl Benzenes:

Dodecyl-, Tridecyl-, and Pentadecyl-, Benzene

Each of these chemicals is part of a group known collectively as alkyl benzenes or alkyl aryl hydrocarbons. Alkyl benzenes suitable for use in making synthetic detergents are known as detergent alkylates. Pentadecyl benzene is understood not to be used as such in Canada.

The alkyl benzenes are manufactured in Canada by reacting propylene with benzene. As used in industry, the alkyl benzenes are mixtures consisting primarily of the three products in varying

(1) Transcript, Vol. 165, p. 24419

(2) Same, Vol. 154, p. 22883

(3) Same, Vol. 135, p. 20171

proportions. As mixtures, they are classified by B.T.N. heading 38.19, but Imperial Oil Limited noted that, "It is conceivable that in the future pure hydrocarbons of this type, as well as the mixtures now used, could be required for detergent manufacture, and therefore both Brussels 29.01 and Brussels 38.19 are pertinent to this discussion." (1)

The main part of the process of manufacture of detergent alkylates consists of chemically reacting propylene tetramer (a polymerized form of propylene) with high purity benzene by a process called alkylation, using an aluminum chloride catalyst. Imperial Oil Limited manufactures alkyl benzenes at Sarnia, Ontario, and Shell Oil Company of Canada Limited makes them at Montreal, Quebec. The former was reported to have begun production in 1957, the latter in the following year. Each of these companies was said to have more than enough capacity to satisfy Canadian demand; the capacity of each plant in 1961 was rated at about 30 million pounds per year. (2)

The detergent alkylates' only use is in the manufacture of synthetic detergents, a use which has grown rapidly. Detergent alkylate was said to be the largest volume organic intermediate used in synthetic detergents, and its use has grown accordingly. Production of synthetic detergents in Canada is reported to have increased rapidly in recent years, from 35 million pounds in 1948 to 235 million pounds in 1960.

The rate of expansion in the use of these alkylates is expected to diminish once the share of synthetic detergents in the total consumption of soap and detergents has stabilized. Many materials are used for the production of detergents, and the detergents are themselves competitive with one another. Fatty alcohols, ethylene oxide, nonyl phenol and dodecyl phenol are other materials used in the manufacture of detergents. The fatty alcohols of B.T.N. heading 15.10 were said to be directly competitive; they are not made in Canada and imports of them in 1960 were valued at approximately \$1.5 million. The value of Canadian consumption of dodecyl phenol and nonyl phenol was estimated, at the public hearing, to be about \$600,000 annually, and of ethylene oxide, as an intermediate chemical for detergent use, at about \$500,000 a year. One factor in the current competitive situation is the concern over biodegradability in detergents as a measure to reduce water pollution. The development of more biodegradable detergents could reduce the share of detergents produced from mixed alkyl benzenes.

Export markets for detergent alkylates were said to be of great importance in achieving an economic operation. Imports have been relatively unimportant in recent years. The decline in imports can be attributed to the successful efforts made by the two domestic producers in supplying the Canadian market. Imperial Oil noted that:

"imports of detergent alkylate have all been from the United States and have steadily declined since the Sarnia facilities came on stream late in 1957 ... Much of the 1959 imports was of a particular type of detergent alkylate which Imperial Oil did not manufacture until last 1960 year." (3)

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- (1) Transcript, Vol. 40, p. 5910
 (2) Same, Vol. 40, p. 5913, 5934
 (3) Same, Vol. 40, p. 5914

Detergent alkylate imports are shown in the following table.

Imports of Alkylaryl Hydrocarbons, Unsulphonated, 1956-63

<u>Year</u>	<u>\$'000</u>
1956	1,940
1957	2,120
1958	1,220
1959	410
1960	50
1961	..
1962	105
1963	350

Source: Department of Industry, Chemical Import Trends

As there was no Canadian detergent alkylate production prior to 1957, the \$1.9 million of imports can be taken to represent the total Canadian market in that year, an estimate consistent with that contained in a joint submission by Colgate-Palmolive Limited and Lever Brothers Limited.⁽¹⁾

Imperial Oil's presentation noted that the company "has priced detergent alkylate such that it is fully competitive with duty-free imported product at the customers' plants after adjusting for fluctuations in the rate of exchange on the U.S. dollar."⁽²⁾ In 1957, the year in which Imperial Oil's plant came on stream, the U.S. price was 12.5 cents per pound, but has declined since. According to trade sources, the Canadian list price since October, 1963 has been 10.25 cents per pound, f.o.b. works, freight equalized;⁽³⁾ this is approximately comparable, allowing for the exchange rate, to the U.S. price, from the end of September 1963 through December 1964, of 9.75 cents per pound. Prices in the United Kingdom were said to move usually in unison with those in the U.S.A., but the spread between them widened in 1960 when the U.K. price did not rise with an increase in the U.S. price. As noted below, this was instrumental in causing Imperial Oil to change its recommendation concerning the British Preferential Tariff. The alkylates are not normally sold on long-term contract; contract sales were said to be not made at all in Canada.

Price comparisons, as reported at the time of the hearing, are shown in the following table. At the levels shown, however, the reason for concern about imports from the U.K. is not evident.

⁽¹⁾ Transcript, Vol. 40, p. 5944-5

⁽²⁾ Same, Vol. 40, p. 5914

⁽³⁾ Canadian Chemical Processing, quarterly price issues

Alkylbenzene Prices, Canada, U.K., U.S.A., 1961

	<u>From Sarnia, Ont.</u>	<u>From U.K.</u>	<u>From U.S.A.</u>
	- U.S.	¢/lb. -	
Base prices,			
March 21, 1961	11.50	10.80	11.50
Freight - Boat	-	1.12	-
- Rail	0.22	-	0.22
Seaway Toll	-	0.02	-
Boat unloading	-	0.10	-
Transfer to customer	-	0.05	-
Cost in Toronto ex Duty	11.72	12.09	11.72
Recommended duty			
7½% B.P.	-	0.81	-
10% M.F.N.	-	-	1.15
Total Cost	11.72	12.90	12.87

Source: Transcript, Vol. 40, p. 5918

The original price advantage over the U.K. was subsequently restored when the U.S. and Canadian prices were again reduced, though the company expressed concern that price changes in the future might result in imports from the U.K.

Since March 21, 1961 the trend of U.S. and Canadian published prices for dodecyl benzene has been as follows:

Published Prices of Dodecyl Benzene
Canada and U.S.A.,
1962-65

<u>Date</u>	<u>Canada</u>	<u>Date</u>	<u>U.S.A.</u>
	U.S. \$/lb.		U.S. \$/lb.
-	..	June, 1962	0.105
October, 1963	0.095	June, 1963	0.102
January, 1964	0.095	July, 1964	0.098
July, 1965	0.095	-	..

Source: Canadian Chemical Processing; Oil, Paint and Drug Reporter

Tariff Considerations

The alkyl aryl hydrocarbons are provided for specifically in tariff item 269b, as follows.

<u>Tariff Item</u>	<u>British Prefer- ential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
269b Alkyl aryl hydrocarbons, unsulphonated, for use in the manufacture of synthetic detergents.....	Free	Free

Item 269b is a temporary tariff item; the expiry date, at present, is January 31, 1967. These products otherwise would probably be dutiable under item 711 at rates of 15 p.c., B.P., 20 p.c., M.F.N.

Imports of the products into the U.S.A. were said to be dutiable at the equivalent of about 50 per cent, based on the prices of 1961.

Detergent alkylates encounter competition, in the manufacture of detergents, from fatty alcohols; these are not made in Canada and are entered free of duty under tariff item 865. Finished synthetic detergents are generally entered into Canada under tariff item 220a(i) at rates of 15 p.c., B.P., 20 p.c., M.F.N. Even with these rates, however, substantial imports of detergents and surface-active agents were reported. These were of concern to Imperial Oil because they reduced the market for the detergent alkylates made in Canada.

Imperial Oil Limited proposed that these hydrocarbons be dutiable at 7½ p.c., B.P. and 10 p.c., M.F.N.⁽¹⁾ In making this proposal, Imperial Oil altered its original recommendation of Free, B.P. and 10 p.c., M.F.N. because the price of the alkyl benzenes in the U.K. had not risen with the increase in prices in Canada and the U.S.A. However, imports were reported to have all come from the U.S.A. at the time of the hearing and, as noted above, the earlier price relationship was restored.

The company intended that its proposal encompass the alkyl benzenes of headings 29.01 and 38.19.

The spokesman for two companies engaged in the manufacture of synthetic detergents, Colgate-Palmolive Limited and Lever Brothers Limited, in a joint submission, suggested that there was a necessity to keep rates of duty on detergent alkylates and fatty alcohols identical because the products are competitive in their use for detergents; unequal rates would discriminate between manufacturers using one raw material and those using the other. With regard to the rates of duty, the spokesman concluded that:

(1) Transcript, Vol. 40, p. 5918

"We don't care what rate it is, basically - and I make this statement assuming that a rate is recommended - if it were free or 10% - as long as they are both the same."(1)

These two companies use detergent alkylates as raw material for powdered detergents, but a competitor, Procter and Gamble Company of Canada Limited, uses fatty alcohols in at least some of its formulations. The two detergent manufacturers considered that if duty-free treatment were to be continued for the fatty alcohols, and Imperial Oil's proposal for alkylates were adopted, they would be at a disadvantage.

Chemical Developments (Canada) Limited, as a user of dodecyl benzene for detergents, agreed that detergent alkylates and fatty alcohols should bear the same rates of duty. As were Colgate-Palmolive and Lever Brothers, the company was concerned with the relative rates.

Imperial Oil, in presenting the case for increased protection, said that "it is vital that the full Canadian market should be available to Canadian producers."(2) The company expressed the view that this would be accomplished by its proposal, by establishing a price differential of about one cent per pound in favour of the Canadian product over imports. It was the company's view that this could be done "without injury to the consumer." It might be noted in the preceding table that, with respect to the U.K. and the U.S.A., Imperial Oil apparently has established a favourable differential even under the existing duty-free situation.

The company indicated that its price was designed to be fully competitive with duty-free entry of the imported product at the customer's plant after allowance for the exchange rate. The company suggested that the proposal was not designed to widen the differential but to offer some protection against uncertainties resulting, for example, from an unfavourable movement in exchange rates.

Imperial Oil also noted that the five major producers of alkylates in the U.S.A. had a total estimated production of about 470 million pounds, more than ten times that of the two producers in Canada though no measure was given by the company of the extent to which size of plant or any other factor, affected costs of production. It was noted, however, by the spokesman for Imperial Oil that the company had favoured essentially duty-free entry for benzene, which is made by Imperial Oil, while requesting protection for the detergent alkylates. One reason for the difference in these proposals was that the company's plant for the production of benzene was among the largest in North America whereas, for the alkylates, one U.S. producer has ten times the capacity of Imperial Oil and another has three times the company's capacity.(3) Also, for benzene, natural and tariff barriers to export sales are not particularly significant, whereas the tariff barrier on exports of dodecyl benzene to the U.S.A., for example, was represented as substantial and, therefore, at least a potential factor in limiting the company's output. On the other hand, the share of imports in the

(1) Transcript, Vol. 40, p. 5948

(2) Same, Vol. 40, p. 5919

(3) Same, Vol. 40, p. 5933

Canadian market has declined very appreciably in recent years even under the duty-free provision.

No representation was made to the Board by the other listed producer, Shell Oil Company of Canada Limited, Montreal.

Hydrolized Protein Retarders

Retarders are used in the production of plaster to extend its setting time. The strength of the retarder determines how much is required, but generally it is between one and 6 pounds per ton of plaster. There are two types of protein retarders: hydrolized vegetable matter and hydrolized animal matter.

Hydrolized vegetable matter is made from wheat gluten. It was made in Canada prior to 1955 by Industrial Grain Products Limited at Fort William, Ontario. The company is a wholly owned subsidiary of Ogilvie Flour Mills Company. About that time the company's product was found to be unsuitable and production was discontinued. However, following further developmental work, it was expected that production would resume.

The economic disposal of gluten was said to be essential to the continued production of wheat starch. Gluten was diverted in 1955 to the manufacture of monosodium glutamate, dealt with in this report under heading 29.23. The company was reported to have ample supplies of gluten to supply the Canadian market for this type of retarder if its product regained acceptance.

Hydrolized animal matter was said to be not made in Canada but imported from the United States. It is produced by grinding and cooking, in steam, the horns and hooves of animals processed by meat packing plants. Although it was argued that such a product is not a chemical, the product was said to be classified in B.T.N. heading 38.19. The representations were made on it, not under this heading, but at a hearing in May 1962, dealing specifically with the relevant end-use provisions of the Tariff, as noted below.

Some hydrolized proteins were said to be of a higher grade for use in the food industry; these usually are of acid rather than alkaline hydrolysis. There also are lactalbumin hydrolizates and casein hydrolizates. Some of these products apparently are in the form of glues of Chapter 35 of the B.T.N. No representations were made for their specific inclusion within any schedule of tariff items to be recommended by the Board. Some functional designation, such as "of a type used for plaster retarders" was thought possibly to be necessary to restrict the classification of any provision under an item worded like B.T.N. heading 38.19.

With respect to Canadian manufacture of hydrolized animal matter, Canadian Gypsum Company Limited said:

"There is no domestic production [of hydrolized animal matter] because it is not economically feasible. The amount of the product used by all gypsum manufacturers in this country is not sufficient to warrant the investment

required to manufacture retarder commercially. Further, Canadian meat packers do not have available the large accumulation of waste horns and hoofs necessary to support the domestic production of retarder, even if such were feasible. In recent years, the larger Canadian packers have not had sufficient accumulation to export to United States retarder manufacturers."⁽¹⁾

The hydrolized vegetable retarders and the hydrolized animal retarders were said to be interchangeable in use; the higher price of the gluten retarder was said to be offset by its greater activity. The cost of the retarder was reported to be about 48 cents per ton of plaster, or about 2 per cent of the selling value of a ton of plaster.⁽²⁾

In a joint submission, Canada Packers Limited, Emery Industries (Canada) Limited and Harchem Limited said that hydrolized animal matter could be provided from Canadian raw material and could be made by Canadian manufacturers.⁽³⁾ Canadian Gypsum Company, however, noted the short supply of the horns and hooves and said that it imported and supplied about 45 per cent of the demand for retarders.⁽⁴⁾ Consumption of these retarders in Canada, as shown in the following table, has been fairly stable for a number of years.

Consumption of Gypsum Retarders by
Gypsum Products Manufacturers, 1959-63

<u>Year</u>	<u>Tons</u>	<u>\$'000</u>
1959	724	146
1960	577	119
1961	522	114
1962	563	120
1963	627	137

Source: D.B.S., Cat. Nos. 44-217 and 44-208

At the hearing in 1962, a spokesman for Canadian Gypsum noted that, of about 700 tons imported in the preceding year, about 350 tons were imported by that company.

Hydrolized animal matter, when for use as a retarder for calcined gypsum, is listed under an extract of tariff item 220a(i) at 10 p.c., B.P. and M.F.N., as well as under an extract of item 711 at the same rate. The double provision was said to obviate the necessity of determining whether these retarders are chemical products for purposes of the Customs Tariff. The provision as an extract of tariff item 220a(i), in any event, brings them within the terms of Reference 120. The hydrolized vegetable retarder and also the hydrolized animal

⁽¹⁾ Transcript, Vol. 80, p. 12220

⁽²⁾ Same, Vol. 80, p. 12217

⁽³⁾ Same, Vol. 62, p. 9201

⁽⁴⁾ Same, Vol. 80, p. 12240

retarder otherwise are probably dutiable at 15 p.c., B.P., 20 p.c., M.F.N. under tariff item 220a(i) or under item 711.

Industrial Grain Products Limited proposed that:

"Until hydrolized protein retarders for use in calcined gypsum are ruled made in Canada we have no objection to imports being allowed entry at lower than 15 per cent B.P., 20 per cent M.F.N., but anticipating future manufacture we recommend that such exceptional treatment be provided under Heading 38.19 on the basis of List 3 in the Industry Committee's submission."⁽¹⁾

The List 3 provision in the Industry Committee's submission was to encompass proposals for lower rates of duty for products of a class not made in Canada.

In the joint proposal of Canada Packers Limited, Emery Industries (Canada) Ltd. and Harchem Limited, a request was made for the elimination of the extract shown under tariff item 711, thereby making hydrolized animal matter dutiable under tariff item 711 at rates of 15 p.c., B.P. and 20 p.c., M.F.N.

Canadian Gypsum Company Limited proposed that imports of hydrolized protein retarder be free of duty. The company noted that as a result of earlier requests the extract shown under tariff item 220a was established at a rate of 10 per cent under both Tariffs. The company at the time of the hearing proposed removal of the 10 per cent duty which it represented as a burden without a benefit. Western Gypsum Products Limited said that it wished "to go on record as supporting the petition filed by the Canadian Gypsum Company Limited."⁽²⁾ In the course of the discussion at the public hearing, the consensus seemed to be that an extract from heading 38.19 for "retarder for calcined gypsum" might best express the interests of the two gypsum companies

Cyclohexanol - Cyclohexanone Mixture

The cyclohexanol - cyclohexanone mixture of B.T.N. heading 38.19 is produced by reacting cyclohexane with air and is used in Canada in the manufacture of nylon 6/6. Cyclohexane has been discussed in detail under B.T.N. heading 29.01 and the individual chemicals, cyclohexanol and cyclohexanone, have been dealt with in this report under B.T.N. headings 29.05 and 29.13, respectively.

Du Pont of Canada Limited makes the cyclohexanol - cyclohexanone mixture at Maitland, Ontario, from cyclohexane purchased from the British American Oil Company Limited, in a process described in the context of nylon intermediates under heading 29.22. The company uses all of its production in the manufacture of nylon.⁽³⁾ The company noted that the particular mixture of its manufacture would not

⁽¹⁾ Transcript, Vol. 80, p. 12204

⁽²⁾ Same, Vol. 80, p. 12249

⁽³⁾ Same, Vol. 117, p. 17535

necessarily meet the needs of potential customers but that it would not likely be economically feasible for Du Pont to manufacture it to others' specifications. As a consequence of not being in a position to meet the needs of other users, Du Pont did not feel justified in requesting the rates of duty, 25 p.c., B.P., 30 p.c., M.F.N., which it had proposed generally for nylon intermediates and, in fact, made no recommendation concerning rates for the mixture. However, Du Pont said that, to protect the raw material supplier (B.A. Oil), rates for the mixture perhaps might be as high as those for cyclohexane under B.T.N. heading 29.01, and the company would not object to rates of 15 p.c., B.P., 20 p.c., M.F.N., the rates recommended generally by the Industry Committee for B.T.N. heading 38.19.

Cyclohexanol - cyclohexanone mixtures may be entered into Canada free of duty under tariff item 921 as a material not ruled for Customs purposes to be of a kind made in Canada imported for use in making synthetic resins or plastics. Otherwise they are dutiable at rates of 15 p.c., B.P., and 20 p.c., M.F.N. under item 220a(i). There are no known imports.

Anti-Foam Preparations

Anti-foam preparations, or defoamers, are used to control or eliminate foam generated during the manufacture of industrial products, to improve product quality and to speed production. Defoamers are sold as solids, solid dispersions and liquids. Hercules Powder Company (Canada) Limited said that:

"To be successful in this area of business it is important that the defoamer manufacturer have considerable basic technical knowledge of what causes foams and how to combat them. It is also highly desirable to have detailed knowledge of the process industry in which foams are encountered and to develop defoamers to solve these problems."(1)

Industries to which defoamers are supplied include the pulp and paper industry, the protective coating, textile, food processing and specialty chemical industries. Nopco Chemical Canada Limited said that there are possibly six or eight companies in Canada making defoaming preparations and that Nopco is one of the major manufacturers, catering in particular to the pulp and paper industry but also to other industries. The company noted that prices of its defoamers in Canada are of the same order as those in the U.S.A., although for some defoamers the Canadian prices were lower. While it maintained that it was not taking undue advantage of the existing duty, the company said it feels that "protection should be there if needed."(2)

Hercules Powder Company (Canada) Limited, at Burlington, Ontario is a major producer of defoamers, which it has manufactured since 1949, following its U.S. parent company's specifications and methods. The company said that it supplies chiefly the paper, paper-board and building materials industries, and noted that competitive

(1) Transcript, Vol. 118, p. 17704

(2) Same, Vol. 117, p. 17556

products are made in Canada and some are imported. Hercules Powder Company said that it imports some defoamers from its parent company in the U.S.A.; these it finds uneconomic to make in Canada. With respect to competition, the company said:

"Since this is a very competitive business, success, as mentioned, hinges on tariff protection, price, quality of product, technical service and sometimes location of the manufacturer with respect to customer."(1)

Dye and Chemical Company of Canada Limited, of Kingston, Ontario, in a letter put in the record at the time of the hearing in January 1963, said that it is one of the largest producers of defoamers in Canada and that production of defoamers, in both liquid and paste form, is a substantial part of its total production.

While no data concerning the total Canadian market for defoamers are publicly available, Hercules Powder Company said that the market is supplied principally by Canadian-made products. In 1962, imports of defoaming agents and foam controllers were valued at about \$710,000, but the value declined to about \$400,000 in 1963. The spokesman for Nopco Chemical Company said his company did not import more than one or two per cent of the defoamers it sold; these were imported because they required special machinery not yet economical to install in Canada.

Anti-foaming agents are dutiable under tariff item 220a(i) at rates of 15 p.c., B.P. and 20 p.c., M.F.N.; some might be imported at the same rates under tariff item 711, although Hercules Powder Company said that "the products of our interest are properly classified and amply described under tariff item 220a(i) with no need for classification under tariff item 711."(2)

The three companies making representations on anti-foaming preparations - Hercules Powder Company, Nopco Chemical Company and Dye and Chemical Company - proposed that the rates of duty for these products under B.T.N. heading 38.19 should continue to be 15 p.c., B.P., 20 p.c., M.F.N.

Nopco Chemical said, "it is consistent to ask the same rates for 38.19 as exist at present."(3) The company noted that B.T.N. heading 38.19 provides a general classification for products, often similar to those classified elsewhere, for example, those included in the company's proposal on 38.14 when for use in petroleum products.

"We feel that the same treatment should be given for this catch-all category so that the same duty treatment will be obtained as elsewhere requested. Our request for rates of 15% B.P. and 20% M.F.N...is directed to that end..."(4)

(1) Transcript, Vol. 118, p. 17705

(2) Same, Vol. 118, p. 17706

(3) Same, Vol. 117, p. 17555

(4) Same, Vol. 117, p. 17554

Hercules Powder Company recommended that rates of 15 p.c., B.P. and 20 p.c., M.F.N. be retained with the subject products properly classified and defined under tariff item 220a(i). The company expressed the view that "If this tariff duty level is not maintained, it is known that many competitive products await entry to provide a serious threat to the business of Canadian manufacturers of these products."(1)

Dye and Chemical Company of Canada, Limited said that it supported the representation made by others, recommending rates of 15 p.c., B.P. and 20 p.c., M.F.N. for heading 38.19.(2)

Glycerides

Monoglycerides are glycerol esters of fatty acids in which only one acid group is attached. Small amounts exist naturally, but they are generally produced synthetically by the alcoholysis of fats with glycerol, yielding a mixture of mono-, di-, and tri-glycerides.

Monoglycerides can be classified to four categories on the basis of purity as follows: Class I, monoglyceride emulsifiers containing approximately 45% monoglyceride, 44% diglyceride and 11% triglyceride; class II, emulsifiers composed of approximately 66% monoglyceride and lesser amounts of the other two components than contained in class I; class III, distilled emulsifiers consisting of approximately 97% monoglyceride and 3% diglyceride; class IV, emulsifiers that are blends of distilled monoglycerides.(3)

The distilled monoglycerides of class III are believed to exist generally in a form properly classified in B.T.N. heading 29.14, but they are dealt with in this part of the report.

Canadian Kodak Sales Limited differentiated as follows between its products, which fall into class III, and those of Atlas Powder Company Canada, Limited which were said to fall into classes I and II.

"Class III products differ quantitatively from class I and class II compounds in every measurement that we have applied, including utility in every finished product.

"Furthermore, class III products differ qualitatively in several...important uses (bread, ice cream, gelled pharmaceutical carrier, and for most practical purposes in bread shortening and dehydrated potato flakes).

"In those applications where it is possible to use any of the four classes, it is necessary to resort to reformulation in order to change from one to the other. In no

(1) Transcript, Vol. 118, p. 17706

(2) Same, Vol. 117, p. 17570

(3) Same, Vol. 117, p. 17632-3

case are any two of the four classes directly interchangeable. In several applications, no amount of reformulation will permit substitution of class I or class II for class III or vice versa."⁽¹⁾

Atlas Powder Company Canada Limited considered the products sold in Canada in three broad groupings: those of about 42 or 45 per cent monoglyceride content, those of about 67 per cent monoglyceride content and those with about 90 per cent or more monoglyceride content. The company stated that the third, the highest content, was not manufactured in Canada but was imported from the U.S.A. Imports were regarded by Atlas Powder as competitive with its production in Canada and to hold "a substantial proportion" of the market. The total market was estimated at 4 million pounds.

Atlas Powder began to manufacture food emulsifiers in 1954 at Brantford, Ontario. The emulsifiers, at the time of the hearing in January 1963, represented more than 28 per cent of the company's sales in Canada and nearly 55 per cent of its production. A spokesman noted that the term "glycerol monostearate" is a misnomer because the products in commerce are derived from natural fats and oils, whether or not hydrogenated in whole or part. The commercial product frequently contains more palmitic acid than stearic, if not fully hydrogenated, and might contain significant quantities of oleic acid as well. Such a product, however, was referred to as a glycerol monooleate.

The production process was described in the following terms by Atlas Powder:

"Glycerol monoesters are produced by charging the selected fat into a reaction kettle, along with the required amount of glycerine to carry on the reaction. The percentage of glycerine is usually in the range of 10 to 20% of the charge weight. The reaction is then carried on in the presence of a catalyst for a period of from 3 to 4 hours depending on the particular product being manufactured at temperatures in excess of 200°C. The reaction is carried on under high vacuum conditions and after completed the catalyst is neutralized and the excess or unreacted glycerine is distilled off. The charge is then dropped to a second tank where it is combined with filter acid and activated carbon and filtered into a third vessel. At this point, antioxidant is added. After this stage, the product may be sprayed, if it is a hard monoglyceride, voted if it is a plastic-type monoglyceride for the baking industry, or it may be packaged without further processing."⁽²⁾

When the emulsifier is intended for use in the baking industry, the primary fat ingredient is pure steamed lard. When for use in ice cream or peanut butter, the fat may be a hydrogenated tallow or a hydrogenated vegetable oil. Where the end product requires a semi-paste or liquid raw material, cotton seed oil or soybean oil may be used in its manufacture. Other products employed are stearic acid and

⁽¹⁾ Transcript, Vol. 117, p. 17643

⁽²⁾ Same, Vol. 117, p. 17576

glycerine. The largest part of the use of these stearates was said to be in the food industry as an emulsifier for bread, shortening, ice cream, margarine, cheese, cake mixes and in other products and as a stabilizer for peanut butter.

A large part of the discussion at the hearing was concerned with the interchangeability of distilled monoglycerides (class III) imported by Canadian Kodak Sales and non-distilled monoglycerides (classes I and II) manufactured by Atlas Powder.

In speaking of this interchangeability, a representative of Canada Packers Limited, appearing as a user and as a witness for Canadian Kodak Sales, expressed the view that: "In some areas they probably could be used interchangeably. In other areas, according to the work and the application work we have done and the applications that we have applied them to, we do find that the distilled monoglycerides have some advantages in some areas."⁽¹⁾ For cake shortening the distilled monoglycerides had been found to have advantages whereas the company found the non-distilled type acceptable for ice cream manufacturing.

A spokesman for Griffith Laboratories Limited of Toronto, a manufacturer of food antioxidants, appearing as a witness for Canadian Kodak Sales Limited, stated that "The comparison between the two types of monoglycerides is such that with diglyceride present, you get separation of the solution - the precipitation of the diglyceride material - and a product, for example, which you will have difficulty shipping in cold weather."⁽²⁾

Carnation Foods Company Ltd. contended that, using the non-distilled monoglyceride, it could not obtain the desired quality in dehydrated potatoes.

The representative of Joe Lowe Corporation of Toronto, which uses monoglycerides in the production of prepared mixes for bakers, appearing as a witness for Canadian Kodak Sales Limited, stated that "Generally speaking, in our usage, we can by diligent work, replace the two types of monoglycerides."⁽³⁾

Although Atlas Powder Company Canada Limited is the only known Canadian producer of monoglycerides, other firms, possibly meat packing houses, were mentioned as possible manufacturers of some monoglycerides for captive use. The primary competitor of Atlas is Canadian Kodak Sales which imports the emulsifiers for re-sale. In addition, Lever Brothers Limited, Swift Canadian Company Limited and the Procter & Gamble Company, Limited were reported to be importers.

The only published market data relate to imports of food emulsifiers; the monoglycerides would make up part of these imports, all of which are believed to have come from the United States.

⁽¹⁾ Transcript, Vol. 117, p. 17648

⁽²⁾ Same, Vol. 117, p. 17662

⁽³⁾ Same, Vol. 117, p. 17667

Food Emulsifier Imports, 1959-63

<u>Year</u>	<u>\$'000</u>
1959	585
1960	690
1961	800
1962	1,105
1963	835

Source: Department of Trade and Commerce, Department of Industry,
Chemical Import Trends

Tariff Considerations

Monoglyceride emulsifiers may be imported at rates of Free, B.P., 5 p.c., M.F.N., shown as Extracts of tariff items 208t and 711.

The appropriate Brussels headings are believed to be 29.14 for the distilled monoglycerides of Class III above, as separate, chemically defined compounds, and heading 38.19 for the products of Classes I, II and IV. Some monoglycerides, having the character of waxes, are classified in B.T.N. heading 34.04, but no representations were made concerning such products, nor was it proposed that they be considered in Reference 120.

Atlas Powder Company Canada Limited recommended that:

"Any ruling...regarding duty on the glycerol fatty acid esters covered by Brussels Nomenclature 28.19...should also be taken to include the purer materials provided for under Brussels Nomenclature 29.14... Because these materials are of a class or kind manufactured in Canada and for other reasons which we will develop...we respectfully suggest that the listing under tariff item 208t be abolished, and that the tariff classification under tariff item 711 be provided at 15, 20, 25 or equivalent."(1)

The company noted that, at the time the decision was made to invest in a branch plant in Canada, monoglycerides were usually dutiable at 15 p.c., M.F.N., but by the time Canadian production began the rate had been reduced to 5 p.c., M.F.N. The 5 p.c. rate was a GATT concession effective in 1952; the plant began production in September 1954.

The spokesman for Atlas Powder mentioned that the company purchased as much of its raw materials in Canada as possible and that Canadian suppliers generally take advantage of the tariff, with the result that, "This has left our company in the very unenviable position of paying the equivalent of a high duty rate on all our raw materials

(1) Transcript, Vol. 117, p. 17572-3

and, at the same time, competing with imports into Canada bearing a 5% duty."⁽¹⁾ Lard is the largest single raw material and, at the price prevailing at the time of the hearing, was dutiable at the equivalent of more than 20 p.c., M.F.N. The company's proposal for rates of 15 p.c., B.P., 20 p.c., M.F.N., therefore, was essentially to offset the higher cost of raw materials which, in turn, was said to reflect the duty on them. With respect to the duty on raw materials, the spokesman for Atlas Powder said, "as an alternative, then, to changing the import duty on monoglyceride, we approached the Government with the proposition that we be accorded duty-free raw materials..."⁽²⁾ However, the company has operated with essentially the existing rate structure since 1954.

Canadian Kodak Sales Limited, an importer of distilled monoglycerides from Distillation Products Industries, a division of its parent firm in Rochester, New York, stated that the company was unaware of a need for any change in the existing rates, and therefore supported the retention of the existing rates. The spokesman for the company was of the view that the imported emulsifiers were "substantially different from any products manufactured in Canada and there is a special demand by some Canadian industrial users for our products."⁽³⁾ The company preferred free entry for these distilled monostearates and the mixtures of Class IV but would rest its proposal on the existing 5 p.c., M.F.N. rate.

Carnation Foods Company Ltd., a manufacturer of dehydrated potato products, requested no change in rates for monoglycerides. The firm contended that domestically produced monoglycerides "do not have the emulsifying properties that are necessary for us to achieve the quality we desire."⁽⁴⁾

Joe Lowe Corporation of Toronto also supported the recommendations of Canadian Kodak Sales Ltd. A spokesman for the firm stated that:

"Our main concern is to buy the one monoglyceride that is most economical; and we can't help feeling that if there is a protection afforded which would mean an increase in one product of a minimum of 15%, all other competitive emulsifiers would immediately rise in price almost that much, which is going to cost us more and which will put the squeeze on us and our baker customers."⁽⁵⁾

The representative added that it bought certain emulsifiers on instructions from New York. "We have bakery customers in Canada, and our firm in the States has the same customers over there, and those customers request the identical product supplied out of our plant as they get from either our New York, Chicago or Los Angeles plants."⁽⁶⁾

(1) Transcript, Vol. 117, p. 17578

(2) Same, Vol. 117, p. 17595

(3) Same, Vol. 117, p. 17626

(4) Same, Vol. 145, p. 21690

(5) Same, Vol. 117, p. 17667

(6) Same, Vol. 117, p. 17669

Sorbitol Fatty Acid Esters

These products were discussed in September, 1961 at the time of the hearing on B.T.N. heading 29.14. However, they are produced from mixtures of fatty acids and, hence, are themselves mixtures properly classified in heading 38.19.⁽¹⁾

Sorbitol fatty acid esters are oil-soluble emulsifiers. They range in state from liquids to hard and brittle substances depending upon the nature of the fats used in their manufacture. Although these esters find application in the cosmetic, pharmaceutical and petroleum industries, their most important use is in the food industry where they are used to emulsify such products as ice cream, cakes, icings; they also are used as anti-foam agents in the concentration of food products such as molasses, milk, sugar, yeast and jams.

The glycerol monostearates discussed above were reported to be directly competitive in certain uses with sorbitol fatty acid esters. Both glycerol monostearates and sorbitol fatty acid esters are made in Canada by Atlas Powder Company Canada Ltd. Some of the more important sorbitol fatty acid esters sold by Atlas Powder are:⁽²⁾

Sorbitan monolaurate
Sorbitan monopalmitate
Sorbitan monostearate
Sorbitan tristearate
Sorbitan monooleate
Sorbitan trioleate
Sorbitan sesquioleate

Atlas Powder reported that the fatty acids, which comprise 50 per cent to 80 per cent of the raw material cost of the esters, are purchased in Canada while the sorbitol, which comprises 10 per cent to 30 per cent of the raw material cost, is imported from the United States over a 15 p.c. rate of duty. However, the company said that it plans to manufacture the sorbitol in Canada.

The manufacturing process was described in the following terms:

"During the reaction process in the manufacture of fatty acid esters, sorbitol is anhydriized at the same time as it is partially esterified with lauric, palmitic, stearic, oleic or similar long chain fatty acids derived from edible fats and oils. The resulting reaction products are usually mixtures of partial esters of various degrees of esterification. Moreover, the complexity is increased by the presence of a number of isomeric esters of the same degree of substitution, besides the usual presence of esters of more than one anhydride. These complex reaction products have technically important surface-active properties that are unobtainable with any known simple derivative.

⁽¹⁾ Transcript, Vol. 62, p. 9253

⁽²⁾ Same, Vol. 62, p. 9260

"In the manufacture of such technical products, both the degree of anhydridization of sorbitol and the degree of esterification of the anhydrides are controlled to yield uniform, reproducible products, as governed by the reaction conditions and checked by such analytical constants as hydroxyl number and saponification value. The reaction takes place in stainless steel equipment at temperatures well in excess of 450°F and under high vacuum."(1)

These products have been manufactured in Canada by Atlas Powder since 1954; at the time of the hearing in 1961 they represented about one-quarter of the value of the company's production, though less than 10 per cent of its sales. Except for minor quantities which the company imported from its parent firm in the United States, its production had supplied the total Canadian market until 1959, when the company's patent expired. At the time of the hearing in 1961, Atlas Powder suggested that import competition may have gained 10 per cent of the market.

Of the products previously listed, all but sorbitan tristearate are ruled made in Canada and dutiable under tariff item 711 at rates of 15 p.c., B.P., 20 p.c., M.F.N. Sorbitan tristearate is currently dutiable under item 208t at Free, B.P. and 15 p.c., M.F.N.

Atlas Powder Company Canada Ltd. proposed that fatty acid esters of sorbitol be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N.(2) The company's proposed rates were intended to apply regardless of B.T.N. classification. It noted the possibility that technological advances might produce pure products that would be properly classified to B.T.N. 29.14.

The company said:

"Our request for additional tariff protection is only to sustain a Canadian industry, and to prevent dumping into the Canadian market similar products of foreign origin. Should this protection be afforded us, it is our stated intention that our prices would not be increased above what they are now, except to compensate for periodic changes in labour or raw material costs."(3)

Molecular Sieves

Molecular sieves are commercial adsorbents used to separate impurities from gases and liquids. Specific impurities can be removed by the proper selection of operating conditions and molecular sieve types. They are crystalline sodium and calcium alumina silicates that have been heated to remove the water of hydration, resulting in extremely porous crystals. By careful control of conditions during their manufacture, the sieves can be made uniform mixtures of all their components. Some of them are made with chemicals absorbed on their

(1) Transcript, Vol. 62, p. 9258-9

(2) Same, Vol. 62, p. 9255

(3) Same, Vol. 62, p. 9256

surfaces for special separation qualities and these are known as chemically-loaded molecular sieves; those without the further chemical processing are known as regular molecular sieves. All are classified in B.T.N. heading 38.19.

These sieves are used in the purification of natural gas, in the manufacture of plastics and rubber, in air separation plants and in oil refineries.

Molecular sieves are not made in Canada. The Linde Gases Division of Union Carbide Canada Limited imports them from its parent company in the United States for resale in Canada; the company in Canada is not itself a user. Union Carbide said, however, that in time the volume used in Canada was expected to justify manufacture here, and the company expected to be the manufacturer. No data concerning consumption or imports are publicly available, but it was suggested that Union Carbide is the sole importer.⁽¹⁾

Molecular sieves of the "regular" type are dutiable under tariff item 208t at rates of Free, B.P., 15 p.c., M.F.N.; chemically loaded molecular sieves are dutiable under tariff item 220a(i) at rates of 15 p.c., B.P., 20 p.c., M.F.N. Most were said to be entered under item 208t.

On the question of whether molecular sieves are properly imported under tariff item 208t, the spokesman for the Industry Committee commented on the difference between "chemically defined substance" for the administration of item 208t and "single chemically defined substance" for the administration of B.T.N. Chapter 29. He said:

"If we have a process that yields a single substance that substance may contain more than one identifiable chemical constituent and still be under 208t... In Brussels, regardless of whether this substance, with two or three constituents, is formed by bringing these constituents together by blending or mixture, or is formed as a result of a single chemical process, it goes under 38.19."⁽²⁾

Another spokesman noted further that if one of two identical compositions was known to be produced by bringing together two constituents, after they had been separated, it would be ruled under item 220a(i), whereas if the other was known to be the result of a chemical reaction, it might still be ruled under item 208t or 711.

Union Carbide Canada Limited recommended that the rates of duty on all types of molecular sieves be Free, B.P., 15 p.c., M.F.N., until the sieves are made in Canada, when rates of 15 p.c., B.P., 20 p.c., M.F.N. should apply.

It said further:

"The principal users...have not seen fit to appear before the Board asking for any change in this rate. If they had

(1) Transcript, Vol. 118, p. 17698

(2) Same, Vol. 118, p. 17695

appeared and asked for lower rates than 0, 15 we would have no objection, but I don't think we are in a position to justify a change purely as a reseller."⁽¹⁾

Naphthenic Acids and Derivatives

Naphthenic acids are saturated carboxylic compounds composed of acids containing a cyclopentane nucleus.

"Chemically, naphthenic acids react in a manner analogous to natural fatty acids. They can be converted to esters, acid amides, acid chlorides and alcohols; or they can form salts with basic compounds such as alkali or alkaline earth metals, ammonia, pyridine, amines, nitrogen bases, hydrogenated nitrogen bases and heavy metals. Naphthenic acids form esters with aliphatic alcohols, glycerols, glycols, phenols and other chemicals containing hydroxyl groups."⁽²⁾

Naphthenic acids are used extensively in the manufacture of prepared driers and can be used as fungicides, emulsifying agents, demulsifying agents, flotation agents, lubricant additives, oxidation accelerators and plasticizers.

The only Canadian producer of naphthenic acids is Imperial Oil Limited which can supply about one half of domestic demand.⁽³⁾ Based on imports, which amounted to \$185,257 in 1964, this would place the value of the Canadian market at approximately \$370,000 per year. These imports came from Colombia (\$101,326), the United States (\$68,603) and Trinidad (\$15,328).

Although the Brussels Nomenclature places naphthenic acid and sulphonaphthenic acid and their salts in heading 38.19, doubt was expressed by companies appearing before the Board as to whether they are within the terms of the Reference. These doubts were based upon the derivation of these products from crude oil in the petroleum refinery, from which it emerges in essentially the same form as it existed in the crude oil, and upon the current practice of importing it under tariff item 269(ii), as a product of petroleum. The rate of duty under item 269(ii) is 1/3 cent per gallon under both Tariffs; the item is within the terms of Reference 120 except in so far as it relates to chemicals and plastics. For fungicidal use, naphthenic acids may be entered free of duty under tariff item 219a or 791.

Nuodex Products of Canada Limited and Dussek Brothers (Canada) Limited brought to the Board's attention that the naphthenic acid salts of lead, manganese, calcium, cobalt, zinc, iron, cerium, lanthanum, barium and other elements of lesser importance are driers as covered in their joint brief under B.T.N. heading 32.11, and that such salts of naphthenic acid require only the addition of a solvent to make them "prepared driers". Because of this, the companies recommended that these salts be treated as driers in accordance with their

(1) Transcript, Vol. 118, p. 17699

(2) Same, Vol. 145, p. 21700

(3) Same, Vol. 145, p. 21702

recommendations under B.T.N. heading 32.11.(1) They jointly recommended a rate of 20 p.c. under both the B.P. and M.F.N. Tariffs.(2)

Dussek Brothers (Canada) Limited suggested that because naphthenic acids are entirely of petroleum origin, they are outside the scope of Reference 120. The company proposed that naphthenic acid continue to be dutiable under tariff item 269(ii) but that, if the Board decides that it does fall within Reference 120, the same rate of duty, 1/3 cent per gallon under both Tariffs, should apply. Based on the average value of imports, 8 cents per pound, the ad valorem equivalent would be less than one per cent.

Nuodex Products of Canada Limited expressed the view that crude naphthenic acid is correctly described as a product of petroleum under item 269(ii), and that distilled naphthenic acid "could be ruled as a chemical under B.T.N. 38.19 with appropriate duty." (3) At a later hearing in May 1963, the company proposed that naphthenic acid, crude or refined, remain classified as a product of petroleum under item 269(ii) but that, if the Board decided that the products are within the scope of the Reference, the same rates of duty, 1/3 cent per gallon under both B.P. and M.F.N. tariffs, be applied.(4)

Imperial Oil Limited said that the classification of naphthenic acid to tariff item 269(ii) appears to be logical:

"Although Brussels appears to classify naphthenic acid in Chapter 38, we believe its nature, origin and the usage of the trade place it more logically in the category of a product of petroleum. As such, it would be outside the scope of Reference 120. If...it be classified in B.T.N. Chapter 38, the inadequate Canadian supply would appear to justify naming it in list two at 1/3¢-1/3¢-1¢ per imperial gallon. Naphthenic acid is a raw material for Canadian industry and, if one-half the Canadian requirement must be imported, any additional duty, obviously, will increase Canadian manufacturing costs. Imperial, as the only apparent Canadian manufacturer, does not object to the present rate of duty on naphthenic acid imports." (5)

Other Products of B.T.N. 38.19

At many times throughout the hearings on Reference 120 reference was made to commercial forms of products that would be classified in B.T.N. heading 38.19 even though the chemically defined forms are classified elsewhere, particularly in Chapters 28 and 29. The principal discussion of some products took place under the other chapters or, in some instances, when a relevant end-use tariff item was before the Board. A number of these scattered representations are mentioned here, together with other products of heading 38.19 that received only brief mention.

(1) Transcript, Vol. 145, p. 21692

(2) Same, Vol. 100, p. 15173

(3) Same, Vol. 145, p. 21704

(4) Same, Vol. 165, p. 24468

(5) Same, Vol. 145, p. 21703

Flotation Agents

In September 1962, during the discussion of end-use tariff items 208e, 208u and 270, concerning chemicals used by mining companies in the recovery of certain minerals by a flotation process, polypropyleneglycol methyl ether (trade-name, Dowfroth) was said to be properly classified in B.T.N. heading 38.19. This product apparently is not made in Canada, but is imported from the U.S.A. Considerable discussion took place whether, as a flotation agent, the product is interchangeable in use with cresylic acid and xanthates. Cresylic acid is a trade designation for a commercial mixture of phenols, cresols and xlenols, probably classified in B.T.N. heading 27.07; cresylic acid as a separate, chemically defined compound is classified in B.T.N. 29.06 where it is discussed in this report. The xanthates, when defined chemicals, are classified in heading 29.31, where they are dealt with in this report. While the question of the interchangeability of these products was not resolved, a spokesman for Canadian Chemical Company Limited said that in the company's experience with flotation agents "it is quite fair to say that there is a high degree of competitiveness and interchangeability in some mines."(1)

Polypropyleneglycol methyl ether is entered free of duty under tariff item 270 as an "oil for use in the concentration of ores." The product was described as a complex organic alcohol, raising uncertainty concerning its classification as an oil under tariff item 270. A spokesman for Canadian Chemical Company noted that "Nevertheless, Canadian Chemical Company would not object to Dowfroth, properly identified chemically, being put in as an exception to tariff item 38.19."(2) The exception provision would continue the duty-free entry.

The Consolidated Mining and Smelting Company of Canada Limited (Cominco) uses flotation agents in processing ores. In a brief presented to the Board, the company dealt with end-use tariff items 208e, 208u and 270 in connection with cresylic acid and its compounds, xanthates and Dowfroth, which it uses in the flotation separation of ores. It buys Dowfroth from Canadian distributors which import it from the U.S.A. Cominco requested that all three end-use tariff items be retained. By way of explanation, the company's brief noted that the end-use provisions undoubtedly were placed in the Tariff to assist the Canadian mining industry and that intensive competition made the continuation of the provision essential. The company also pointed out that, while the products are not made in Canada, the elimination of the duty-free provision would serve only to increase manufacturing costs. It said, "The harmful effect of elimination of these end-use items is of real significance when the impact on the mining industry across Canada is considered."(3)

The Canadian Metal Mining Association, in its brief on these three end-use items, said that, in 1961, imports under the three items amounted to over \$2 million, and estimated total consumption of these products by the Canadian mining industry to be about \$4 million. The Association recommended that, because of the importance of these

(1) Transcript, Vol. 88, p. 13410

(2) Same, Vol. 88, p. 13432

(3) Same, Vol. 88, p. 13419

chemicals in mining, the tariff items remain unchanged and the end-use provision be retained.

Canadian Chemical Company Limited and Cyanamid of Canada Limited, producers of xanthates, confined their discussion to xanthates and the duty-free provision of tariff item 208u. Cyanamid supported the position taken by Canadian Chemical Company in proposing the elimination of tariff item 208u in so far as xanthates produced in Canada are concerned. Canadian Chemical Company said that the duty-free tariff treatment of item 208u is no longer justified because the xanthates are made in Canada. The company said that its successful manufacture of xanthates depends upon its obtaining the whole Canadian market. The spokesman for Canadian Chemical Company suggested that the other chemicals enumerated in tariff item 208u continue to be entered free of duty while they are not made in Canada.(1)

Specialty Steel Preparations

At the time of the public hearing in January 1963, Union Carbide Canada Ltd. expressed interest in six products which the company imported in very small quantities from the parent company in the United States for re-sale to the steel industry, for use in certain specialty type steels. The products are not made in Canada. Subsequently, the company informed the Board that its interest was restricted to the first four of the six products listed.

Barium - cadmium complex
Barium - silicon
Calcium - magnesium
Calcium - silicon
Vanadium oxide preparations
Vanadium pentoxide preparations

These goods are dutiable under tariff items 711 or 220a(i) at rates of 15 p.c., B.P. and 20 p.c., M.F.N.; the vanadium oxide and pentoxide preparations may be entered duty-free under tariff item 490a, when for use as catalysts, or free of duty under tariff item 208g if combined with a binding material. Union Carbide suggested, for the products of interest to it, that "as they are of a 'class or kind not made in Canada', they should be incorporated into list 3 at 0% B.P. and 0% M.F.N. until such time as they are produced in Canada."(2)

Aerosol Propellant Preparations

Du Pont of Canada Limited submitted a statement on aerosol propellant preparations under B.T.N. heading 38.19; these are mixtures of chlorofluorohydrocarbons. The individual chlorofluorohydrocarbons have been dealt with in this report under B.T.N. heading 29.02. The company said that these mixtures, used as propellants, can be made in unlimited variations and that the mixing is a simple, inexpensive operation. There were no known imports of blends of chlorofluorohydrocarbons. Du Pont noted that its prices for the chlorofluorohydrocarbons were at the same level as the U.S. prices. The prices of the mixtures

(1) Transcript, Vol. 88, p. 13464

(2) Same, Vol. 116, p. 17391

were directly proportional to the content of the single chemicals comprising them; there was no additional charge for the mixing operation.(1)

Du Pont of Canada recommended that rates of 15 p.c. B.P., 20 p.c., M.F.N., apply to these blends. These are the rates at which the mixtures are dutiable under tariff item 220a(i) or 711. They might, however, be entered free of duty under end-use item 791 for use in the manufacture of pesticides, and the company recommended that this item be deleted from the Customs Tariff. The subject is discussed further under B.T.N. heading 29.02.

Electrode Pastes

These pastes are mixtures of carbonaceous materials (e.g., coal and coal-tar pitch) and are used to make continuous carbon electrodes for electric furnaces. The best known composition of this kind is "Soderberg paste". They are classified in B.T.N. heading 38.19.

Shawinigan Chemicals Limited expressed the view that Soderberg paste is not a chemical and is not within the terms of Reference 120.(2) The company makes electrode pastes for electric furnaces and at the time it presented its brief to the Board, it had succeeded in manufacturing a paste which it said was suitable for use by Consolidated Mining and Smelting Company of Canada Limited (Cominco) in its pig iron furnaces. Prior to that time Cominco had purchased all of its requirements in the U.S.A. because it considered the Canadian product not suitable. Cominco estimated the annual value of its requirement for this kind of electrode to be about \$35,000. However, it is used by many other companies and no estimate is available of total consumption.

Temporary tariff item 220g provided for "Electrode Paste (Soderberg type) for use in the manufacture of pig iron", duty-free under both B.P. and M.F.N. Tariffs. Cominco proposed that this item, which is part of Reference 120, be continued. However, tariff item 220g has expired since the hearing on this subject.

Shawinigan Chemicals recommended that tariff item 220g be allowed to expire so that the product would revert to tariff item 711 and be dutiable at rates of 15 p.c., B.P., 20 p.c., M.F.N. Domtar Chemicals Limited, in a letter at the time of the hearing, said that it supported Shawinigan Chemicals' submission.(3)

Epoxy Resin Curing Agents

During the course of its submission on epoxy resins of B.T.N. 39.01, Ciba Company Limited made a proposal concerning epoxy resin curing agents of B.T.N. 38.19. These are required as hardeners for use with epoxy resins. Some curing agents, along with some of the raw materials used in making them, are manufactured in Canada; specific examples were not named because of commercial secrecy. The curing agents are free of duty under tariff item 921 while deemed for Customs

(1) Transcript, Vol. 117, p. 17550

(2) Same, Vol. 165, p. 24437

(3) Same, Vol. 165, p. 24467

purposes to be of a kind not made in Canada; the company proposed that this provision be continued. Shawinigan Chemicals Limited proposed that such a provision should exist only while the curing agents are "not made in Canada and not competitive with made in Canada during agents..."⁽¹⁾

Another type of epoxy resin curing agent, known by its trade name Genamid, an amino-amide resin, was brought to the Board's attention during the discussion of 39.01. Uncertainty was expressed as to whether it is properly classified, in the B.T.N., in heading 38.19 or in heading 39.01 which deals with condensation, polycondensation and polyaddition products. The product is a monomeric condensation product of fatty acids and is believed to be properly classified in heading 38.19.

Caledonia Chemical Company Limited imports this material from General Mills Inc., U.S.A., for resale to the protective coating and plastics industries. A similar product known by the trade name Lancast A is imported from Lancaster Chemical Company, U.S.A. These amino-amide resins were said to be competitive with Versamid, a product discussed under B.T.N. heading 39.01. Caledonia Chemicals sells Versamid as well as Genamid in Canada and the spokesman for the company suggested that Versamid was preferred for most applications.⁽²⁾

In speaking of the uses of Genamid, he said:

"The amine groups of the Genamid react with the epoxy groups of the epoxy resins to form co-polymers, which are cross linked in a complex three dimensional structure. Because of this unique function, amino-amide resin/epoxy resin systems are used in concrete toppings and patching, for repair and maintenance of concrete that has been spalled, broken or eroded. They are also used in conductive, non-sparking floorings in hospitals, explosion-proof areas, and in chemical plants. Genamid amino-amide resins are also used for potting and encapsulating, tooling compounds, and adhesive formulations."⁽³⁾

Genamid amino-amide resins are imported as polyamide type resins, free of duty under tariff item 901(a)4, though the company spokesman thought that they should be classified under tariff item 901(a)9, which provides duty-free entry for types of resins not more specifically described in the other provisions of the item.

Caledonia Chemicals requested that Genamid amino-amide resins be listed as exceptions under Brussels heading 39.01 and remain free of duty until they are ruled made in Canada. The company contended that the limited use of the products in this country precluded manufacture here and that the imposition of a duty would serve no useful purpose but result only in higher costs to consumers.

No public information is available on imports or consumption.

⁽¹⁾ Transcript, Vol. 133, p. 19948

⁽²⁾ Same, Vol. 132, p. 19719

⁽³⁾ Same, Vol. 132, p. 19711

Trisodium Phosphate, Chlorinated

Trisodium phosphate chlorinated was discussed before the Board at the time of the hearing on B.T.N. heading 28.48; preparations of the product probably would be classified under heading 38.19. However, the main interest in the product was expressed with respect to its use as a cleaner and disinfectant, particularly in dairy applications. The relevant tariff items, at the time, were said to be items 219a and 791, both of which pertain to disinfectants and pesticides; they, and consequently trisodium phosphate chlorinated, are dealt with primarily in the section of the report on B.T.N. heading 38.11.

In summary, the only producer in Canada, The Diversey Corporation Canada Limited, requested rates of 15 p.c., B.P., 20 p.c., M.F.N., principally because of higher costs claimed to exist when producing trisodium phosphate chlorinated in Canada than in the U.S.A.

Crude Petroleum Purifying Preparations

Crude oil at the well-head is often an emulsion of oil and salt water, held in a stable condition by asphalt and paraffins. To remove most of the salt water, the emulsion is broken down by purifying agents in a treater near the well-site; remaining water is removed at the refinery by the use of similar purifying agents.

The purifying agents are chemical products whose compositions are not generally known by the oil companies which buy and use them. They are purchased by their trade names and are especially manufactured to meet specific conditions. However, the Board was advised that they are properly classified in B.T.N. heading 38.19.

These preparations are supplied in Canada by a few companies that import them from the U.S.A. Imperial Oil Limited estimated that Canadian consumption was valued at about \$200,000 per year.

These preparations are currently imported duty-free under tariff item 262 as chemical compounds for removing water and salts from crude petroleum oils.

Three companies, Imperial Oil Limited, Sun Oil Company Limited and the British American Oil Company Limited, submitted proposals at the hearing in January 1963. Letters were received from Irving Refining Limited and Nopco Chemical Canada Limited. All companies recommended that free entry under tariff item 262 be retained. Nopco added that, if these preparations become made in Canada, rates of 15 p.c., B.P. and 20 p.c., M.F.N. should apply. British American Oil said:

"if the tariff is to be rearranged in accordance with the Brussels Nomenclature, we would support the...recommendation that 'crude petroleum purifying preparations' be shown on...a duty-free basis."(1)

(1) Transcript, Vol. 115, p. 17365

A spokesman for the Industry Committee suggested that a wording be adopted that referred specifically to chemical compounds of a type which remove water and salts from crude petroleum oil.

Vinsol Emulsion

Vinsol is the trade name of a substantially gasoline insoluble resin fraction of a solvent extract of pine wood. Vinsol emulsion is an aqueous emulsion of vinsol. It is made by Hercules Powder Company in the United States and is not made in Canada.

Vinsol emulsion is an ingredient of a binder used by manufacturers of rock wool insulation. The view was expressed that it is classified in B.T.N. heading 38.19 as a preparation consisting of a mixture of gasoline-insoluble rosin with ammonia in water.

It is imported duty-free under tariff item 921 by Harrisons and Crosfield (Canada) Limited; the company proposed the retention of tariff item 921 for vinsol emulsion, or of a closely similar item having essentially the same effect. If the Board decided not to retain tariff item 921, or a closely similar item, the company requested that vinsol emulsion "however it may be described, be ... free of duty under both B.P. and M.F.N. Headings, until made in Canada." (1) Harrisons and Crosfield suggested the following wording to describe vinsol emulsion in the Tariff:

"The fraction of a solvent extract of pine wood having a petroleum ether solubility of less than 25%, when in the form of an aqueous emulsion containing about 40% solids." (2)

Fusel Oil

During the hearing of B.T.N. heading 29.04, reference was made to fusel oil. The product is an impure amyl alcohol, obtained as a by-product in the alcoholic fermentation of starch - or sugar - containing materials such as potatoes or grain. Its most important uses are in the paint industry as a solvent, as a raw material in the production of amyl acetate and as a liquor flavorant.

The market, consisting of imports from the United States and domestic production, is believed to be small, probably less than \$100,000 per year.

Fusel oil is currently classified under tariff item 157a, free of duty under all Tariffs. It is classified in B.T.N. heading 38.19.

No specific proposal respecting fusel oil was made to the Board.

(1) Transcript, Vol. 174, p. 28508

(2) Letter to the Tariff Board, August 15, 1963

Dippel's Oil

Dippel's oil, produced by the destructive distillation of bones or other animal substances, is a product used in organic preparations, as a source of pyrrole and as a denaturant.

The product is classified to tariff item 711 in the Canadian Customs Tariff and 38.19 in the B.T.N. Tariff item 711 is in Reference 120 only in so far as it relates to chemicals and plastics.

No specific proposal on Dippel's oil was made to the Board.

Seculate Anti-Condensation Compound

This product is a viscous greyish substance applied to pipes and tanks primarily to prevent the condensation of moisture from the atmosphere and secondarily to inhibit fungus formation.

Following Tariff Board Appeal No. 679, dated November 20, 1962, the compound was reclassified for duty purposes from tariff item 247, with rates of $17\frac{1}{2}$ p.c., B.P., 20 p.c., M.F.N., to tariff item 219a(1) at rates of Free, B.P., $12\frac{1}{2}$ p.c., M.F.N., when in packages not exceeding three pounds each, gross weight and otherwise free of duty under both Tariffs, under item 219a(2).

As a result of the re-wording of tariff item 219a in March 1964 to cover products exclusively used as pesticides, the compound was excluded from that item; it was ruled properly classified by tariff item 220a(i) at rates of 15 p.c., B.P., 20 p.c., M.F.N., effective May 14, 1965.

This decision occasioned notice of a further appeal to the Tariff Board by Chemical Concentrates Corporation of Toronto, an importer of seculate anti-condensation compound, which contended that the product should be classified to tariff item 208t, bearing rates of Free, B.P., 15 p.c., M.F.N. The appeal was withdrawn by the appellant in February 1966.

The company's interest is in obtaining lower rates of duty on the anti-condensation compound.

Although the particular product dealt with under Appeal No. 679 is not made in Canada, competitive substitutes may be available from Canadian production.

No specific proposal relating to seculate anti-condensation compound was made to the Board during Reference 120.

Dry Bleach and Oxygen Bleach

During the hearing on heading 29.35 Javex Company Ltd. made proposals for a number of products, including a dry bleach and an oxygen bleach known by the company trade names, both of which are classified to B.T.N. 38.19.

Javex oxygen bleach, with sodium perborate as its main ingredient, has been marketed since 1951 while Javex dry bleach, with dichlorodimethyl hydantoin as its main ingredient, has been sold in Canada since 1956.

The company proposed continuation of rates of 15 p.c., B.P., 20 p.c., M.F.N., the existing rates under tariff item 220a(i).⁽¹⁾

Other Products

At the time of its presentation to the Board on the subject of anti-foaming preparations, Nopco Chemical Canada Limited mentioned that some of its corrosion inhibitors, anti-rust preparations, inhibitors for acid and salt preparations, oils for use in belt dressing preparations, drawing compounds and rolling and cutting oils for metal processing and special soaps for paint removers would be classified in B.T.N. heading 38.19. The corrosion inhibitors, anti-rust preparations and inhibitors for acid and salt preparations when used in petroleum processing and petroleum products were covered by the company during the hearing on B.T.N. heading 38.14, where it requested rates of 15 p.c., B.P., 20 p.c., M.F.N. However, Nopco expressed the opinion that these products, when used in other industries, would be classified in B.T.N. heading 38.19. With respect to drawing compounds and rolling and cutting oils for use in metal processing, Nopco said that they are usually mixtures of various types of fatty oils, fatty esters and special soaps and that they could readily come under heading 38.19. These are currently dutiable under tariff item 220a(i) at rates of 15 p.c., B.P., 20 p.c., M.F.N. The same rates of duty apply, under tariff item 277, to blown oils, for use in making belt dressing preparations; this item is not in the Reference. Some wire-drawing compounds are classified as lubricating greases, dutiable under tariff item 272a at rates of 12½ p.c., B.P., 15 p.c., M.F.N. This item is not in the Reference.

Two tariff items, 220d and 220f, of interest to manufacturers of electrical equipment, were brought to the attention of the Board under B.T.N. heading 38.19.

<u>Tariff Item</u>	<u>B.P.</u>	<u>M.F.N.</u>
220d Chemical preparations, dry, compounded of more than one substance, when imported by manufacturers of fluorescent lamps or electronic tubes for use exclusively in coating the inside of fluorescent lamps or electronic tubes, in their own factories.....	Free	5 p.c.
220f Askarels (non-flammable liquids) for use in the manufacture of electrical apparatus.....	Free	5 p.c.

⁽¹⁾ Transcript, Vol. 73, p. 11071

The Canadian General Electric Company Limited said that it is a very large consumer of the chemical preparations dutiable under tariff item 220d, and noted that these account for a large percentage of the company's manufacturing costs. In requesting retention of this item, the company said:

"In view of the fact that no one in Canada is producing fluorescent and electronic tube compounds, and further, due to the fact that we are highly sensitive to cost increases, particularly in respect of materials which form as great a percentage of cost as do the chemicals covered by Item 220d, we respectfully request that Item 220d be retained in its present form at least until such time as the Board deals with the individual chemical items which are the subject of the main reference."(1)

Canadian Westinghouse Company Limited also opposed any change in tariff item 220d saying that, as these products are not available in Canada and are not likely to be available in the future, the imposition of higher rates would be of no benefit to Canadian producers and would result in needless added costs to the Canadian electrical industry, already experiencing strong foreign competition. Data on production, consumption and imports are not readily available, nor is a precise description of the chemical materials.

Askarels are non-flammable liquids used for transformer insulation; they are various chlorinated compounds. They are not made in Canada but were said to represent an important factor in the cost of electrical products. Canadian General Electric recommended that item 220f be retained in its present form at least until an adequate supply is available from Canadian production.(2) Canadian Westinghouse Company also opposed any change in tariff item 220f for the same reasons as it opposed any change in item 220d.

Both items are part of Reference 120, Chemicals.

CHEMICAL PRODUCTS AND FLASH LIGHT MATERIALS, OF A KIND
AND IN A FORM SUITABLE FOR USE IN PHOTOGRAPHY
- B.T.N. HEADING 37.08

This heading provides for chemical preparations for use directly in the production of photographic images, combustible flash powders for use in photography and also single chemicals for photographic use when put up in measured portions or in packages as sold by retail with any indication, such as labels or literature, indicating that they are for photographic use. Excluded from the heading, however, are auxiliary products such as glue, retouching paints, etc., flashbulbs and any of the chemicals, regardless of packaging and labeling, which fall into headings 28.49 to 28.52.

The materials covered by this heading are used at three different stages of the process of producing photographs. Emulsions

(1) Transcript, Vol. 90, 13628

(2) Same, Vol. 90, 13626

are required to render photographic film, paper and glass capable of receiving images; combustible flash powders, which are understood to be obsolete, were used in the actual taking of pictures; products such as developers, fixers, intensifiers and reducers, toners and clearing agents are used in the processing of exposed film and the production of finished prints.

The only Canadian producer that made representations to the Board with respect to this heading was Vac Incorporated, Montreal, P.Q., which produces goods of the last group named in the preceding paragraph and markets them through its sales subsidiary Christie Chemical Company Limited, which has distribution points in Montreal, Toronto, Ottawa and Vancouver. It was suggested at the hearing that there may be small quantities of photographic chemicals of these types produced by other companies in Canada, but no details were made available to the Board. Emulsions are produced at Toronto by Canadian Kodak Company Limited for captive use in the manufacture of photographic products.

Two estimates of the size of the Canadian market for photographic chemicals were advanced at the hearing. The spokesman for Vac Incorporated suggested that it might be as high as \$12 million annually, while a representative of Canadian Kodak suggested that a figure of \$6 to \$7 million would be more realistic. There are no published data.

In 1964, the D.B.S. for the first time had a statistical class specifically for imports of photographic chemicals. However, estimates of imports of photographic chemicals are available for a number of earlier years. It is not possible to establish whether these figures cover all the products of heading 37.08, or whether they go beyond the heading. Imports were said to be principally from the U.S.A., smaller amounts coming from Britain, Germany and Belgium and Luxembourg.

Imports of Photographic Chemicals,
(Including Lithographic, Reproduction
and X-ray Chemicals), 1956-64

<u>Year</u>	<u>Value</u> \$'000
1956	860
1957	1,025
1958	1,250
1959	1,550
1960	2,000
1961	2,500
1962	3,680
1963	3,970
1964	4,366

Source: Department of Trade and Commerce and Department of Industry,
Chemical Import Trends

The Canadian market is centred in Ontario and Quebec. Principal suppliers of imported materials were said to be Canadian Kodak and Ansco Canada Limited, which distribute goods produced by their parent companies at Rochester, N.Y. and Binghamton, N.Y., respectively. Although no details were provided, Vac Incorporated pointed to the high transportation costs on bulky, relatively low cost chemicals and suggested that prices were set in competition with imports often sold in Canada at the same price as in the U.S.A., despite exchange rate and tariff considerations.

At the time of the hearing, Vac Incorporated stated that the company did not have the capacity to supply the entire Canadian market for the products in which it was interested, but that this could be achieved, for the major portion of Canadian requirements, by the addition of some vats and increasing the number and size of batches made. The company had no interest in the flashlight materials and emulsions covered by the heading and there were also a few products that could not be offered by the company because they were not required in sufficient quantities to merit the setting up of blending and quality-control equipment in competition with low priced imports.(1)

Tariff Considerations

Photographic chemicals in the nature of preparations are at present dutiable under tariff item 220a(i) as "Chemical preparations, compounded of more than one substance, n.o.p. - when dry or liquid containing not more than two and one-half per centum of proof spirit", at rates of 15 p.c., B.P. and 20 p.c., M.F.N. Most single chemicals, even though labelled or packaged for photographic use, would be Free, B.P., 15 p.c., M.F.N., under tariff item 208t when of a kind not made in Canada, and 15 p.c., B.P., 20 p.c., M.F.N., under tariff item 711 when ruled to be of a kind made in Canada.

Vac Incorporated, having indicated that the products in which it was interested were all classified under tariff item 220a(i), proposed the continuation of the existing rates of duty, 15 p.c., B.P., 20 p.c., M.F.N., under an item worded as heading 37.08. As an alternative, the company indicated an interest in obtaining access to the U.S. market, from which it is now excluded by high tariffs, and suggested that a common market in photographic chemicals would be acceptable to it.(2)

The Industry Committee also recommended rates of 15 p.c., B.P., 20 p.c., M.F.N., for heading 37.08, these "being the same levels of duty as have been generally recommended for other products of Canadian chemical industry".(3)

Cost comparisons are not available to permit the evaluation of the need for tariff protection for the operations of Vac Incorporated or to estimate the extent to which the requested continuation of the existing rates would enable the company to increase its share of the market in competition with imported materials.

(1) Transcript, Vol. 114, p. 17215

(2) Same, Vol. 114, p. 17200

(3) Same, Vol. 114, p. 17187

Tariff Item 761

At the hearing at which Vac Incorporated was represented, there was also some discussion of tariff item 761, which covers:

"Collodions and emulsions thereof, iodizers for collodion, and stripping solutions, when imported for use exclusively by photo-engravers, lithographers, rotogravure printers, or engravers of copper rollers, in their manufacturing operations."

<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>	<u>General Tariff</u>
15 p.c.	17½ p.c.	17½ p.c.

In the B.T.N., products covered by this item would be classified mainly under headings 37.08 and 39.03. The spokesman for Vac Incorporated indicated that his company had no interest in the products of this item.(1)

In a letter to the Board, dated June 12, 1963, Latimer Limited, Toronto, Ontario suggested that this item might be deleted. It had been added to the tariff some years ago, probably at the request of Latimer Limited, and related to materials used in a process now said to be obsolete.

(1) Transcript, Vol. 114, p. 17213

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Table 1

Imports: Black, bone and ivory, s.c. 8183^(a)

Tariff Item 239

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value \$/lb.</u>
	<u>lb.</u> (000)	<u>\$</u> (000)	
	<u>1. Total</u>		
1953	275	45	.16
1954	260	44	.17
1955	216	39	.18
1956	217	40	.18
1957	186	33	.18
1958	189	34	.18
1959	225	40	.18
1960	170	23	.14
1961	221	35	.16
1962	128	24	.19
1963	158	29	.19
	<u>2. United States</u>		
1953	273	45	.16
1954	258	44	.17
1955	215	38	.18
1956	216	40	.18
1957	186	33	.18
1958	189	34	.18
1959	225	40	.18
1960	170	23	.14
1961	221	35	.16
1962	128	24	.19
1963	158	29	.19

(a) Beginning in 1964 included in s.c. 413-99

Table 2

Imports: Charcoal, animal, for use in the refining of sugar or corn products, s.c. 2054^(a)

Tariff Item 689

Year	Total Imports		Unit Value	Dutiable Value	Duty Collected	Duty as p.c. of Dutiable Value
	lb.	\$	\$/lb.	\$	\$	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	2,656	207	.08	30	7,477	25.0
1954	2,523	194	.08	29	7,355	25.0
1955	3,588	291	.08	35	8,781	25.0
1956	3,605	307	.09	27	6,787	25.0
1957	3,156	263	.08	36	8,924	25.0
1958	3,430	311	.09	19	4,768	25.0
1959	2,891	257	.09	27	6,735	25.0
1960	2,675	224	.08	52	12,963	25.0
1961	3,668	342	.09	60	14,924	25.0
1962	3,121	326	.10	26	6,558	25.0
1963	3,611	398	.11	-	-	-
1964	5,109	491	.10	*	94	24.8
<u>2. United Kingdom</u>						
1953	2,049	173	.08	-	-	-
1954	1,966	164	.08	-	-	-
1955	2,897	256	.09	-	-	-
1956	3,103	280	.09	-	-	-
1957	2,543	227	.09	-	-	-
1958	3,096	292	.09	-	-	-
1959	2,469	230	.09	-	-	-
1960	1,791	172	.10	-	-	-
1961	2,680	282	.11	-	-	-
1962	2,673	299	.11	-	-	-
1963	3,611	398	.11	-	-	-
1964	4,576	465	.10	-	-	-
<u>3. Egypt</u>						
1953	330	18	.05	18	4,471	25.0
1954	336	18	.05	18	4,499	25.0
1955	560	28	.05	28	7,104	25.0
1956	392	22	.06	22	5,409	25.0
1957	392	23	.06	23	5,738	25.0
1958	333	19	.06	19	4,768	25.0
1959	200	13	.07	13	3,279	25.0
1960	663	38	.06	38	9,497	25.0
1961	988	60	.06	60	14,924	25.0
1962	448	26	.06	26	6,558	25.0
1963	-	-	-	-	-	-
1964	-	-	-	-	-	-

(a) Beginning in 1964 renumbered as s.c. 413-12, "Animal Charcoal"; also includes part of former s.c. 2052 and tariff item 662

Table 3

Imports: Activated clay for the refining of oils, s.c. 7018^(a)

Tariff Items 263c and 295c

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	..	444	..	232	23,247	10.0
1954	..	835	..	285	28,487	10.0
1955	..	1,247	..	253	25,309	10.0
1956	..	1,484	..	189	18,876	10.0
1957	..	1,537	..	144	14,423	10.0
1958	..	981	..	84	8,450	10.0
1959	..	1,083	..	101	10,139	10.0
1960	..	936	..	116	11,648	10.0
1961	..	1,007	..	144	15,307	10.7
1962	..	934	..	305	45,640	15.0
1963	..	1,406	..	288	40,990	14.2
1964	5,706	419	.07	176	22,750	13.0
<u>2. United States</u>						
1953	..	444	..	232	23,247	10.0
1954	..	835	..	285	28,487	10.0
1955	..	1,247	..	253	25,271	10.0
1956	..	1,478	..	182	18,224	10.0
1957	..	1,530	..	138	13,763	10.0
1958	..	978	..	82	8,203	10.0
1959	..	1,083	..	101	10,139	10.0
1960	..	903	..	116	11,648	10.0
1961	..	1,007	..	144	15,307	10.7
1962	..	934	..	305	45,640	15.0
1963	..	1,406	..	288	40,990	14.2
1964	5,645	408	.07	176	22,750	13.0

(a) Beginning in 1964 renumbered as s.c. 429-15, "Clays and earths, activated"; also includes part of s.c. 8415

Table 4

Imports: Carbon, activated, s.c. 413-15^(a)

Tariff Item 238

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	<u>Value</u>
				(000)		
			<u>1. Total</u>			
1964	5,622	1,011	.18	2	217	12.6
			<u>2. United Kingdom</u>			
1964	73	13	.18	-	-	-
			<u>3. United States</u>			
1964	5,141	844	.16	2	197	12.2
			<u>Germany, Fed. Rep. of</u>			
1964	11	2	.18	-	-	-
			<u>5. Netherlands</u>			
1964	398	152	.38	*	20	19.8

(a) Class established in 1964

Table 5

Imports: Tar, pine, crude, in packages of not less than 15 gallons,
and pine pitch, s.c. 1832^(a)

Tariff Item 585

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value \$/gal.</u>
	<u>gal.</u> (000)	<u>\$</u> (000)	
	<u>1. Total</u>		
1953	437	97	.22
1954	275	102	.37
1955	293	126	.43
1956	279	125	.45
1957	267	120	.45
1958	248	107	.43
1959	278	118	.42
1960	225	105	.46
1961	210	97	.46
1962	234	114	.49
1963	272	124	.46
	<u>2. United States</u>		
1953	436	97	.22
1954	251	97	.39
1955	292	126	.43
1956	279	125	.45
1957	266	120	.45
1958	246	105	.43
1959	275	117	.42
1960	222	102	.46
1961	198	92	.47
1962	230	112	.49
1963	269	122	.45

^(a) Beginning in 1964 included in s.c. 399-35

Table 6

Imports: Turpentine, spirits of, s.c. 1835^(a)

Tariff Item 261

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>
	<u>gal.</u>	<u>\$</u>	<u>Value</u>
	(000)	(000)	\$/gal.
<u>1. Total</u>			
1953	1,580	890	.56
1954	1,566	869	.56
1955	1,554	972	.63
1956	1,304	881	.68
1957	1,283	905	.70
1958	1,340	909	.68
1959	1,095	779	.71
1960	1,141	794	.70
1961	993	656	.66
1962	1,015	546	.54
1963	1,046	597	.57
<u>2. United States</u>			
1953	1,580	890	.56
1954	1,566	869	.56
1955	1,553	968	.62
1956	1,301	873	.67
1957	1,281	899	.70
1958	1,339	907	.68
1959	1,064	760	.71
1960	1,069	739	.69
1961	926	618	.67
1962	962	521	.54
1963	1,018	581	.57

(a) Beginning in 1964 included in s.c. 397-39, 399-20, 399-35 and 407-99

Table 7

Imports: Turpentine, s.c. 399-20^(a)

Tariff Item 261

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
			<u>1. Total</u>			
1964	5,800	330	.06	-	-	-
			<u>2. United States</u>			
1964	5,800	330	.06	-	-	-

(a) Class established in 1964

Table 8

Imports: Oil for the concentration of ores, s.c. 7151^(a)

Tariff Item 270

<u>Year</u>	<u>Total Imports</u>	<u>Unit</u>	
	<u>gal.</u>	<u>Value</u>	
	(000)	\$/gal.	
	<u>1. Total</u>		
1953	169	192	1.14
1954	212	220	1.04
1955	237	302	1.27
1956	189	281	1.48
1957	240	362	1.50
1958	181	267	1.47
1959	221	311	1.41
1960	245	356	1.45
1961	246	396	1.61
1962	209	333	1.59
1963	230	413	1.80
	<u>2. United States</u>		
1953	169	192	1.14
1954	212	220	1.04
1955	237	302	1.27
1956	189	281	1.48
1957	240	362	1.50
1958	181	267	1.47
1959	221	311	1.41
1960	245	356	1.45
1961	242	382	1.58
1962	208	331	1.59
1963	221	382	1.73

^(a) Beginning in 1964 included in s.c. 429-17 and 439-99

Table 9

Imports: Pine oil, pine tar and pine pitch, s.c. 399-35^(a)

Tariff Items 261, 270 and 585

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
			<u>1. Total</u>			
1964	6,945	634	.09	1	132	19.8
			<u>2. United Kingdom</u>			
1964	63	4	.06	-	-	-
			<u>3. United States</u>			
1964	6,882	630	.09	1	132	19.8

(a) Class established in 1964

Table 10

Imports: Rosin oils, spirits and acids n.e.s., s.c. 399-10^(a)

Tariff Items 208t, 220a(i), 266, 711, 851 and 923

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
	<u>1. Total</u>					
1964	13,999	1,689	.12	219	35,827	16.4
	<u>2. United States</u>					
1964	13,999	1,689	.12	219	35,827	16.4

^(a) Class established in 1964

Imports: Preparations or chemicals, weed-killing, s.c. 8069^(a)

Tariff Items 219a(1), 219a(2) and 791

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	3,014	-	-	-
1954	2,627	5	602	12.5
1955	2,448	25	3,083	12.5
1956	2,888	39	4,919	12.5
1957	3,407	49	6,072	12.5
1958	3,121	33	4,129	12.5
1959	2,830	45	5,606	12.5
1960	4,694	21	2,660	12.6
1961	6,128	34	4,279	12.5
1962	5,259	63	7,872	12.6
1963	6,074	57	7,104	12.5

2. United Kingdom

1953	28	-	-	-
1954	86	-	-	-
1955	46	-	-	-
1956	252	-	-	-
1957	400	-	-	-
1958	301	-	-	-
1959	195	-	-	-
1960	364	-	-	-
1961	487	-	-	-
1962	703	-	-	-
1963	1,016	-	-	-

Table 11
(Cont'd)

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>3. United States</u>				
1953	2,785	-	-	-
1954	2,536	5	602	12.5
1955	2,388	25	3,083	12.5
1956	2,635	39	4,919	12.5
1957	2,788	48	5,963	12.5
1958	2,720	33	4,129	12.5
1959	2,423	45	5,606	12.5
1960	4,122	21	2,660	12.6
1961	5,209	34	4,279	12.5
1962	4,103	63	7,872	12.6
1963	4,171	57	7,076	12.5

(a) Beginning in 1964 included in s.c. 407-78, 409-94, 409-99, 418-82, 418-84, 418-86 and 418-89

Table 12

Imports: Nicotine, salts of nicotine; preparations containing nicotine in a free or combined state, for dipping, spraying or fumigating, n.o.p., s.c. 8070^(a)

Tariff Item 209b

Year	Total Imports		Unit Value	Dutiable Value	Duty Collected	Duty as p.c. of Dutiable Value
	lb. (000)	\$ (000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1953	137	115	.84	-	-	-
1954	93	90	.97	-	-	-
1955	131	98	.75	-	-	-
1956	79	82	1.04	-	-	-
1957	32	26	.83	-	-	-
1958	48	37	.78	-	-	-
1959	45	34	.75	-	-	-
1960	42	35	.83	-	-	-
1961	42	35	.83	-	-	-
1962	73	48	.66	*	77	12.5
1963	79	56	.71	*	51	12.6
<u>2. United Kingdom</u>						
1953	-	-	-	-	-	-
1954	4	3	.83	-	-	-
1955	21	14	.68	-	-	-
1956	18	13	.75	-	-	-
1957	3	2	.73	-	-	-
1958	24	19	.79	-	-	-
1959	45	34	.75	-	-	-
1960	41	34	.83	-	-	-
1961	40	34	.83	-	-	-
1962	34	27	.79	-	-	-
1963	46	37	.80	-	-	-

Table 12
(Cont'd)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	<u>Dutiable</u>
				(000)		<u>Value</u>
<u>3. United States</u>						
1953	136	114	.84	-	-	-
1954	85	84	.99	-	-	-
1955	110	84	.76	-	-	-
1956	61	69	1.13	-	-	-
1957	29	24	.84	-	-	-
1958	10	9	.87	-	-	-
1959	*	*	.84	-	-	-
1960	*	*	1.12	-	-	-
1961	2	2	.93	-	-	-
1962	*	*	.93	*	77	12.5
1963	3	3	1.06	*	51	12.6

(a) Beginning in 1964 included in s.c. 418-79

Table 13

Imports: Chloropicrin, ethylene oxide, methyl bromide, methyl formate, cyanides, carbon bisulphide, acrylonitrile, or mixtures containing any of these, for combatting destructive insects and pests, s.c. 8071^(a)

Tariff Item 219e

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	125	-	-	-
1954	115	-	-	-
1955	105	-	-	-
1956	83	-	-	-
1957	88	-	-	-
1958	67	-	-	-
1959	92	-	-	-
1960	80	-	-	-
1961	104	-	-	-
1962	89	*	43	12.4
1963	107	*	34	19.9
<u>2. United States</u>				
1953	125	-	-	-
1954	115	-	-	-
1955	101	-	-	-
1956	80	-	-	-
1957	84	-	-	-
1958	67	-	-	-
1959	89	-	-	-
1960	77	-	-	-
1961	100	-	-	-
1962	88	*	43	12.4
1963	104	*	34	19.9

(a) Beginning in 1964 included in s.c. 405-08, 406-99, 408-39, 409-99, 411-71, 411-99 and 418-99

Table 14

Imports: Preparations or chemicals, non-alcoholic, such as are used for disinfecting, dipping, spraying or fumigating, when in packages not exceeding three pounds each, in weight, s.c. 8072(a)

Tariff Item 219a(1)

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	500	360	45,008	12.5
1954	372	304	37,996	12.5
1955	364	302	37,778	12.5
1956	420	346	43,265	12.5
1957	362	307	38,499	12.5
1958	469	404	50,544	12.5
1959	602	491	61,940	12.6
1960	548	437	54,873	12.5
1961	625	465	58,127	12.5
1962	608	472	59,186	12.5
1963	507	399	50,055	12.5
<u>2. United Kingdom</u>				
1953	141	-	-	-
1954	66	-	-	-
1955	61	-	-	-
1956	73	-	-	-
1957	54	-	-	-
1958	66	*	117	12.5
1959	111	-	-	-
1960	109	5	585	12.5
1961	161	-	-	-
1962	127	-	-	-
1963	105	-	-	-

Table 14
(Cont'd)

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>3. United States</u>				
1953	341	341	42,654	12.5
1954	305	303	37,934	12.5
1955	297	296	37,037	12.5
1956	337	336	42,014	12.5
1957	307	307	38,416	12.5
1958	403	403	50,377	12.5
1959	485	485	61,205	12.6
1960	434	428	53,692	12.5
1961	460	460	57,513	12.5
1962	474	466	58,385	12.5
1963	395	393	49,243	12.5

(a) Beginning in 1964 included in s.c. 405-99, 418-40, 418-58, 418-61, 418-99 and 879-99

Table 15

Imports: Preparations or chemicals, non-alcoholic, for disinfecting, dipping, spraying or fumigating, n.o.p., and materials, n.o.p., for manufacturing the same, s.c. 8073(a)

Tariff Items 219a(2) and 791

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	5,992	-	-	-
1954	7,108	-	-	-
1955	7,634	-	-	-
1956	7,798	-	-	-
1957	8,407	-	-	-
1958	8,397	-	-	-
1959	10,512	13	2,131	16.3
1960	10,456	40	7,164	17.8
1961	13,074	19	2,996	15.8
1962	13,402	50	8,072	16.2
1963	13,189	42	7,261	17.2

2. United Kingdom

1953	482	-	-	-
1954	681	-	-	-
1955	469	-	-	-
1956	396	-	-	-
1957	333	-	-	-
1958	249	-	-	-
1959	331	-	-	-
1960	476	-	-	-
1961	516	-	-	-
1962	396	-	-	-
1963	833	-	-	-

Table 15
(Cont'd)

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>3. United States</u>				
1953	5,242	-	-	-
1954	6,054	-	-	-
1955	6,879	-	-	-
1956	7,172	-	-	-
1957	7,820	-	-	-
1958	7,804	-	-	-
1959	9,705	12	1,882	15.9
1960	9,476	35	6,190	17.7
1961	11,926	18	2,851	16.1
1962	12,178	44	6,851	15.7
1963	11,089	42	7,261	17.2

4. Germany, Fed. Rep. of

1953	206	-	-	-
1954	292	-	-	-
1955	168	-	-	-
1956	77	-	-	-
1957	79	-	-	-
1958	256	-	-	-
1959	259	-	-	-
1960	284	-	-	-
1961	410	-	-	-
1962	395	-	-	-
1963	401	-	-	-

(a) Beginning in 1964 included in various classes

Table 16

Imports: Synthetic organics n.e.s., botanicals and arsenicals
formulated, s.c. 418-40(a)

Tariff Items 219a(1), 219a(2), 250 and 791

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	1,404	450	.32	7	842	12.0
<u>2. United States</u>						
1964	1,227	421	.34	6	699	11.9

(a) Class established in 1964

Table 17

Imports: D.D.T. dusts, emulsifiable solutions and wettable
powders, s.c. 418-30(a)

Tariff Item 219a(2)

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	528	113	.21	*	21	12.0
<u>2. United States</u>						
1964	528	113	.21	*	21	12.0

(a) Class established in 1964

Table 18

Imports: Dithiocarbamates, with or without insecticide
(formulated), s.c. 418-57^(a)

Tariff Item 219a(2)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	Duty as p.c. of Dutiable Value
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
			<u>1. Total</u>			
1964	1,253	734	.59	10	1,350	13.5
			<u>2. United States</u>			
1964	1,253	734	.59	10	1,350	13.5

(a) Class established in 1964

Table 19

Imports: Mercurial fungicides (except seed treatments),
s.c. 418-58(a)

Tariff Items 219a(1) and 219a(2)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u> <u>p.c. of</u> <u>Dutiable</u> <u>Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
				(000)		
			<u>1. Total</u>			
1964	345	309	.89	10	1,418	13.6
			<u>2. United Kingdom</u>			
1964	69	37	.53	-	-	-
			<u>3. United States</u>			
1964	276	272	.98	10	1,418	13.6

(a) Class established in 1964

Table 20

Imports: Fungicides n.e.s. (except seed treatment)
 s.c. 418-59^(a)

Tariff Item 219a(2)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	<u>Dutiable</u>
				(000)		<u>Value</u>
<u>1. Total</u>						
1964	2,741	1,343	.49	12	2,031	16.6
<u>2. United Kingdom</u>						
1964	38	11	.30	-	-	-
<u>3. United States</u>						
1964	2,432	1,204	.49	12	2,031	16.6
<u>4. Germany, Fed. Rep. of</u>						
1964	262	125	.48	-	-	-

(a) Class established in 1964

Table 21

Imports: Organic mercurial seed treatments, s.c. 418-61 ^(a)

Tariff Items 219a(1) and 219a(2)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1964	998	799	.80	4	559	12.4
<u>2. United Kingdom</u>						
1964	57	20	.35	-	-	-
<u>3. United States</u>						
1964	924	773	.84	4	559	12.4
<u>4. Netherlands</u>						
1964	18	6	.34	-	-	-

(a) Class established in 1964

Table 22

Imports: Other agricultural dusts and sprays (except
herbicides), s.c. 418-79(a)

Tariff Items 209b and 219a(2)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1964	483	213	.44	48	2,474	5.1
<u>2. United Kingdom</u>						
1964	29	24	.84	-	-	-
<u>3. United States</u>						
1964	445	182	.41	48	2,474	5.1
<u>4. Netherlands</u>						
1964	8	6	.81	-	-	-

(a) Class established in 1964

Table 23

Imports: Herbicides based on chlorate, borate or
2,4,5-T, s.c. 418-82(a)

Tariff Items 219a(1) and 219a(2)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	<u>Value</u>
				(000)		
			<u>1. Total</u>			
1964	1,258	184	.15	3	350	12.5
			<u>2. United States</u>			
1964	1,257	183	.15	3	350	12.5

(a) Class established in 1964

Table 24

Imports: 2,4-D ester dusts, ester formulations and amine
formulations, s.c. 418-84(a)

Tariff Items 219a(1) and 219a(2)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u> <u>p.c. of</u> <u>Dutiable</u> <u>Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
			<u>1. Total</u>			
1964	1,192	560	.47	1	177	12.4
			<u>2. United Kingdom</u>			
1964	123	84	.68	-	-	-
			<u>3. United States</u>			
1964	1,068	476	.45	1	177	12.4

(a) Class established in 1964

Table 25

Imports: Mixtures of 2,4-D and 2,4,5-T, s.c. 418-86^(a)

Tariff Items 219a(1) and 219a(2)

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
			<u>1. Total</u>			
1964	73	65	.89	19	2,339	12.5
			<u>2. United States</u>			
1964	73	65	.89	19	2,339	12.5

^(a) Class established in 1964

Table 26

Imports: Herbicides n.e.s., s.c. 418-89^(a)

Tariff Items 219a(1) and 219a(2)

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)		<u>\$</u>	<u>\$</u>	<u>Dutiable</u>
				(000)		<u>Value</u>
<u>1. Total</u>						
1964	5,357	3,855	.72	23	3,351	14.7
<u>2. United Kingdom</u>						
1964	457	271	.59	13	1,912	15.0
<u>3. United States</u>						
1964	3,444	2,042	.59	10	1,439	14.2
<u>4. France</u>						
1964	75	75	1.00	-	-	-
<u>5. Germany, Fed. Rep. of</u>						
1964	66	43	.65	-	-	-
<u>6. Switzerland</u>						
1964	1,306	1,397	1.07	-	-	-

^(a) Class established in 1964

Table 27

Imports: Insecticides and rodenticides n.e.s., s.c. 418-99^(a)

Tariff Items 219a(1), 219a(2) and 219e

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	5,723	3,067	.54	328	42,264	12.9
<u>2. United Kingdom</u>						
1964	92	33	.36	-	-	-
<u>3. United States</u>						
1964	5,263	2,758	.52	303	39,180	12.9
<u>4. Germany, Fed. Rep. of</u>						
1964	265	232	.88	1	185	12.5
<u>5. Italy</u>						
1964	72	22	.31	22	2,755	12.5

(a) Class established in 1964

Table 28

Imports: Agricultural chemicals, formulated, insecticides and rodenticides, calendar year, 1964

Usual Tariff Items	Principal Countries	Total Imports		Unit Value \$/lb.	Former Statistical Classes(a)
		lb. (000)	\$ (000)		
D.D.T. dusts, emulsifiable solutions and wettable powders, s.c. 418-30	All Countries United States	528	113	.21	8073*
		528	113	.21	
Synthetic organics n.e.s., botanicals and arsenicals formulated, s.c. 418-40	All Countries United States	1,404	450	.32	8072*, 8073*, 8190, 8293, 8311
		1,227	421	.34	
Dithiocarbamates, with or without insecticides (formulated), s.c. 418-57	All Countries United States	1,253	734	.59	8073*
		1,253	734	.59	
Mercurial fungicides (except seed treatments), s.c. 418-58	All Countries United States	345	309	.89	8072*, 8073*
		276	272	.98	
Fungicides n.e.s. (except seed treatments), s.c. 418-59	All Countries United States	2,741	1,343	.49	8073*
		2,432	1,204	.49	
Organic mercurial seed treatments, s.c. 418-61	All Countries United States	998	799	.80	8072*, 8073*
		924	773	.84	
Other agricultural dusts and sprays (except herbicides), s.c. 418-79	All Countries United States	483	213	.44	8070, 8073*
		445	182	.41	

Table 28
(Cont'd)

Usual Tariff Items	Principal Countries	Total Imports		Unit Value \$/lb.	Former Statistical Classes(a)
		lb. (000)	\$ (000)		
Herbicides based on chlorate, borate or 2,4,5-T, s.c. 418-82	219a(1)	1,258	184	.15	8069*
	219a(2)	1,257	183	.15	
2,4-D ester dusts, ester formu- lations and amine formulations, s.c. 418-84	219a(1)	1,192	560	.47	8069*
	219a(2)	1,068	476	.45	
Mixtures of 2,4-D and 2,4,5-T, s.c. 418-86	219a(1)	73	65	.89	8069*
	219a(2)	73	65	.89	
Herbicides n.e.s., s.c. 418-89	219a(1)	5,357	3,855	.72	8069*
	219a(2)	3,444	2,042	.59	
	Switzerland	1,306	1,397	1.07	
Insecticides and rodenticides n.e.s., s.c. 418-99	219a(1)	5,723	3,067	.54	8071*, 8072*,
	219a(2)	5,263	2,758	.52	8073*
	219e				

(a) An asterisk denotes only part of former s.c. included in present class

Table 29

Imports of pesticides from the U.S.A., 1959-64

	1959		1960		1961		1962		1963		1964	
	Quantity lb. (000)	Value \$ (000)	Quantity lb. (000)	Value \$ (000)	Quantity lb. (000)	Value \$ (000)	Quantity lb. (000)	Value \$ (000)	Quantity lb. (000)	Value \$ (000)	Quantity lb. (000)	Value \$ (000)
DDT formulations containing 20 to 74 per cent DDT(1)	711	262	438	168	336	134	148	72	173	74	197	66
DDT formulations containing 75 per cent or more DDT(1)	20	5	5	3	117	29	77	15	87	15	346	59
Herbicides, 2,4-D & 2,4,5-T as parent acid(1)	2,710	1,158	3,951	2,044	3,941	1,969	3,530	1,466	3,755	1,402	2,245	796
Herbicides, n.e.c.	2,512	1,141	3,155	1,933	5,139	2,907	4,730	2,040	3,078	1,750	3,706	2,242
Insecticides, technical, concentrates and formulations - 15 p.c. or more organic phosphates, n.e.c.	593	388	421	306	753	461	833	452	510	446	329	255
Insecticides, technical, concentrates and formulations - 15 p.c. or more polychlors, n.e.c.	2,994	1,934	2,755	1,454	3,769	1,937	1,709	1,665	1,094	959	1,211	794
Agricultural insecticides and formulations, n.e.c.	1,548	752	1,803	865	1,844	1,294	2,021	1,557	1,862	1,515	5,638	1,310

Table 29
(Cont'd)

	1959		1960		1961		1962		1963		1964	
	Quan- tity lb. (000)	Value \$ (000)	Quan- tity lb. (000)	Value \$ (000)	Quan- tity lb. (000)	Value \$ (000)	Quan- tity lb. (000)	Value \$ (000)	Quan- tity lb. (000)	Value \$ (000)	Quan- tity lb. (000)	Value \$ (000)
Fungicides	3,827	2,142	4,594	2,561	4,552	2,602	5,047	3,130	7,275	3,921	5,958	3,215
Fumigants, soil, grain and industrial	313	64	395	83	401	100	372	180	314	102	368	149
Insecticides and pesticides, household and industrial, n.e.c.	3,121	1,234	3,010	1,144	2,208	1,028	1,877	916	1,277	760	1,598	1,175
Disinfectants, household and industrial, n.e.c.	3,347	1,260	3,476	1,534	2,677	1,438	2,786	1,500	2,758	1,548	3,173	1,893
Total	21,695	10,341	24,004	12,095	25,735	13,899	23,130	12,993	22,183	12,493	24,768	11,955

(1) Quantity in terms of contained chemical

Source: United States Exports, U.S. Department of Commerce, Bureau of the Census, Cat. No. FT. 410

Table 30

Imports: Vegetable oils, n.o.p., and mixtures of animal, mineral and vegetable oils, for textiles (cotton softeners), s.c. 1625(a)

Tariff Items 208t and 711

Year	Total Imports		Unit Value	Dutiable Value	Duty Collected	Duty as p.c. of Dutiable Value
	lb.	\$	\$/lb.	\$	\$	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	1,978	426	.22	426	82,199	19.3
1954	1,812	334	.18	334	64,557	19.3
1955	2,321	457	.20	456	88,312	19.4
1956	2,895	551	.19	549	106,628	19.4
1957	2,393	485	.20	478	90,480	18.9
1958	2,548	537	.21	532	98,925	18.6
1959	2,315	500	.22	490	91,981	18.8
1960	2,356	545	.23	536	99,958	18.7
1961	2,014	488	.24	479	91,304	19.1
1962	2,429	608	.25	573	111,776	19.5
1963	2,980	788	.26	755	141,816	18.8
<u>2. United States</u>						
1953	1,973	416	.21	416	80,841	19.4
1954	1,810	330	.18	330	63,991	19.4
1955	2,309	447	.19	447	86,900	19.5
1956	2,890	543	.19	541	105,315	19.5
1957	2,356	472	.20	465	88,503	19.0
1958	2,506	528	.21	523	97,389	18.6
1959	2,311	493	.21	483	90,948	18.8
1960	2,348	536	.23	526	98,469	18.7
1961	2,003	479	.24	470	89,931	19.1
1962	2,413	594	.25	558	109,493	19.6
1963	2,965	770	.26	741	139,658	18.8

(a) Beginning in 1964 included in s.c. 393-99 and 429-82

Table 31

Imports: Textile specialty chemicals, prepared (bulk)
s.c. 429-82^(a)

Tariff Items 203, 203a, 208t, 219a(2), 220a(i), 254(4) and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	10,826	3,040	.28	2,427	452,498	18.6
<u>2. United Kingdom</u>						
1964	211	56	.27	26	3,876	14.9
<u>3. United States</u>						
1964	8,708	2,335	.27	1,985	378,056	19.0
<u>4. Germany, Fed. Rep. of</u>						
1964	1,649	532	.32	328	56,119	17.1
<u>5. Netherlands</u>						
1964	21	4	.17	3	308	8.9
<u>6. Switzerland</u>						
1964	236	114	.48	85	14,139	16.7

(a) Class established in 1964

Table 32

Imports: Sizing preparations, n.o.p., s.c. 1846^(a)

Tariff Items 220a(i) and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	p.c. of
				(000)		Dutiable
						Value
<u>1. Total</u>						
1953	1,238	148	.12	145	28,978	20.0
1954	1,546	165	.11	149	29,894	20.0
1955	1,155	118	.10	118	23,672	20.1
1956	862	114	.13	114	22,746	20.0
1957	1,212	151	.12	148	29,695	20.0
1958	1,301	184	.14	183	36,568	20.0
1959	1,934	258	.13	249	46,428	18.6
1960	2,216	278	.13	274	51,428	18.8
1961	2,160	324	.15	324	60,868	18.8
1962	2,013	344	.17	340	62,997	18.6
1963	1,995	242	.12	241	46,676	19.4
<u>2. United States</u>						
1953	1,234	147	.12	144	28,838	20.0
1954	1,546	165	.11	149	29,894	20.0
1955	1,155	118	.10	118	23,672	20.1
1956	812	106	.13	105	21,073	20.0
1957	1,212	151	.12	148	29,695	20.0
1958	1,301	184	.14	183	36,568	20.0
1959	1,889	251	.13	242	45,998	19.0
1960	2,216	278	.13	274	51,428	18.8
1961	2,160	324	.15	324	60,868	18.8
1962	2,013	344	.17	340	62,997	18.6
1963	1,995	242	.12	241	46,676	19.4

(a) Beginning in 1964 included in s.c. 429-82 and 429-99

Table 33

Imports: Metalworking compounds prepared, s.c. 429-52^(a)

Tariff Items 220a(i) and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u> <u>p.c. of</u> <u>Dutiable</u> <u>Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
			(000)			
	<u>1. Total</u>					
1964	17,021	3,333	.20	3,285	638,298	19.4
	<u>2. United Kingdom</u>					
1964	293	294	1.00	292	43,657	15.0
	<u>3. United States</u>					
1964	16,713	3,025	.18	2,981	592,096	19.9
	<u>4. Ireland</u>					
1964	1	2	1.31	2	339	20.0
	<u>5. Germany, Fed. Rep. of</u>					
1964	11	8	.79	8	1,639	19.4
	<u>6. Sweden</u>					
1964	2	3	1.29	3	567	20.0

(a) Class established in 1964

Imports: Gasoline anti-oxidants, s.c. 8430^(a)

Tariff Item 220c

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	lb.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/lb.	\$	\$	Dutiable
				(000)		Value
<u>1. Total</u>						
1953	475	374	.79	372	74,292	20.0
1954	293	251	.86	251	50,147	20.0
1955	441	321	.73	317	63,381	20.0
1956	633	481	.76	481	96,170	20.0
1957	479	381	.79	381	76,104	20.0
1958	428	357	.83	357	71,305	20.0
1959	443	364	.82	363	70,384	19.4
1960	383	316	.83	316	61,517	19.5
1961	398	390	.98	390	75,736	19.4
1962	353	353	1.00	353	65,906	18.7
1963	429	388	.90	386	70,130	18.2
1964	436	325	.75	324	58,072	17.9
<u>2. United Kingdom</u>						
1953	1	1	.76	1	83	15.1
1954-58	-	-	-	-	-	-
1959	30	40	1.31	40	5,932	15.0
1960	16	20	1.23	20	3,028	15.0
1961	31	45	1.42	45	6,709	15.0
1962	68	93	1.37	93	13,835	14.9
1963	137	138	1.01	136	20,375	15.0
1964	138	97	.70	97	14,494	15.0
<u>3. United States</u>						
1953	474	373	.79	371	74,209	20.0
1954	293	251	.86	251	50,147	20.0
1955	441	321	.73	317	63,381	20.0
1956	633	481	.76	481	96,170	20.0
1957	479	381	.79	381	76,104	20.0
1958	428	357	.83	357	71,305	20.0
1959	412	324	.79	323	64,451	19.9
1960	366	296	.81	296	58,489	19.8
1961	367	345	.94	345	69,027	20.0
1962	286	261	.91	261	52,071	20.0
1963	292	250	.86	250	49,755	19.9
1964	298	228	.76	228	43,578	19.2

(a) Beginning in 1964 renumbered as s.c. 429-07

Table 35

Imports: Compounds of tetraethyl lead, s.c. 8295^(a)

Tariff Item 263

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	26,859	10,457	.39	10,457	522,840	5.0
1954	30,591	11,429	.37	11,428	570,696	5.0
1955	35,059	12,707	.36	12,707	635,362	5.0
1956	36,508	13,349	.37	13,349	667,446	5.0
1957	6,594	2,373	.36	2,373	118,670	5.0
<u>2. United States</u>						
1953	26,859	10,457	.39	10,457	522,840	5.0
1954	30,591	11,429	.37	11,428	570,696	5.0
1955	35,059	12,707	.36	12,707	635,362	5.0
1956	36,508	13,349	.37	13,349	667,446	5.0
1957	6,594	2,373	.36	2,373	118,670	5.0

(a) Beginning in 1958 included in s.c. 8415

Table 36

Imports: Additives for mineral oils, s.c. 429-08^(a)

Tariff Items 220a(i), 220e, 269(i), 269(ii) and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1964	40,489	9,114	.23	9,072	703,678	7.8
<u>2. United Kingdom</u>						
1964	18	9	.49	4	654	14.9
<u>3. United States</u>						
1964	40,469	9,104	.22	9,066	702,858	7.8
<u>4. Germany, Fed. Rep. of</u>						
1964	2	1	.45	1	166	14.9

(a) Class established in 1964

Table 37

Imports: Charge preparations for fire extinguishers,
s.c. 429-42^(a)

Tariff Items 220a(i) and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u> <u>p.c. of</u> <u>Dutiable</u> <u>Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
			<u>1. Total</u>			
1964	1,095	231	.21	218	39,578	18.2
			<u>2. United Kingdom</u>			
1964	356	56	.16	56	8,240	14.8
			<u>3. United States</u>			
1964	740	175	.24	162	31,338	19.3

(a) Class established in 1964

Table 38

Imports: Compound catalysts, s.c. 429-22^(a)

Tariff Items 220a(i), 263c, 490a, 711, 875c and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
			<u>1. Total</u>			
1964	10,710	5,480	.51	1,201	230,948	19.2
			<u>2. United Kingdom</u>			
1964	170	394	2.32	46	6,969	15.0
			<u>3. United States</u>			
1964	10,447	4,956	.47	1,136	220,309	19.4
			<u>4. Germany, Fed. Rep. of</u>			
1964	58	76	1.30	15	2,987	20.0
			<u>5. Sweden</u>			
1964	32	51	1.56	-	-	-

(a) Class established in 1964

Table 39

Imports: Materials, not mentioned elsewhere, for use as catalysts
in refining petroleum, s.c. 8434^(a)

Tariff Item 263c

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	..	2,625	..	-	-	-
1954	..	2,909	..	-	-	-
1955	..	4,991	..	-	-	-
1956	..	6,465	..	-	-	-
1957	..	6,465	..	-	-	-
1958	..	2,779	..	-	-	-
1959	..	2,691	..	-	-	-
1960	..	1,880	..	-	-	-
1961	..	2,297	..	1	117	19.9
1962	..	1,902	..	18	3,670	20.0
1963	..	2,765	..	5	992	20.0
<u>2. United States</u>						
1953	..	2,625	..	-	-	-
1954	..	2,906	..	-	-	-
1955	..	4,856	..	-	-	-
1956	..	6,339	..	-	-	-
1957	..	6,136	..	-	-	-
1958	..	2,604	..	-	-	-
1959	..	2,235	..	-	-	-
1960	..	1,872	..	-	-	-
1961	..	2,288	..	1	117	19.9
1962	..	1,889	..	18	3,670	20.0
1963	..	2,693	..	5	992	20.0

(a) Beginning in 1964 included in s.c. 429-22 and 401-99

Table 40

Imports: Rubber and plastics compounding agents n.e.s., s.c. 429-72^(a)

Tariff Items 269c, 711, 851 and 921

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	20,301	4,125	.20	1,160	206,432	17.8
<u>2. United Kingdom</u>						
1964	259	115	.44	21	3,211	14.9
<u>3. United States</u>						
1964	19,950	3,983	.20	1,119	199,991	17.9
<u>4. Germany, Fed. Rep. of</u>						
1964	64	22	.34	18	3,050	16.5
<u>5. Japan</u>						
1964	28	5	.19	1	180	14.8

(a) Class established in 1964

Table 41

Imports: Naphthenic acid, s.c. 413-28(a)

Tariff Items 269(ii) and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u> \$/lb.	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u> (000)	<u>\$</u> (000)				
<u>1. Total</u>						
1964	2,221	185	.08	185	1,621	0.9
<u>2. United States</u>						
1964	738	69	.09	69	569	0.8
<u>3. Colombia</u>						
1964	1,354	101	.07	101	1,009	1.0
<u>4. Trinidad</u>						
1964	130	15	.12	15	43	0.3

(a) Class established in 1964

Table 42

Imports: Collecting reagents for concentrating ores, metals or minerals, s.c. 429-17^(a)

Tariff Items 39(ii), 208u, 220a(i) 270 and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	255,486	714	.28	54	8,593	15.9
<u>2. United States</u>						
1964	254,488	710	.28	54	8,593	15.9
<u>3. Republic of South Africa</u>						
1964	998	4	.41	-	-	-

(a) Class established in 1964

Table 43

Imports: Household chemical specialties, n.o.p., s.c. 8249^(a)

Tariff Items 219a(1), 219a(2), 220a(i), 220a(ii), 246 and 711

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1962	467	432	82,126	19.0
1963	408	390	73,128	18.8
1964	1,555	1,203	228,166	19.0
<u>2. United Kingdom</u>				
1962	68	62	7,768	12.6
1963	65	64	7,978	12.5
1964	248	78	9,229	11.8
<u>3. United States</u>				
1962	390	369	74,107	20.0
1963	342	325	64,807	20.0
1964	1,277	1,095	212,084	19.4

(a) Prior to 1962 included in s.c. 8072, 8393 and 8415; beginning in 1964 renumbered as s.c. 800-89

Table 44

Imports: Naphtha, including solvent naphtha, s.c. 7187^(a)

Tariff Items 269(i), 269(ii), 590 and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>gal.</u>	<u>\$</u>	<u>\$/gal.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	12,812	2,526	.20	2,512	114,500	4.6
1954	10,597	2,194	.21	2,177	92,476	4.2
1955	15,720	3,112	.20	3,058	137,413	4.5
1956	15,713	3,265	.21	3,121	136,161	4.4
1957	13,772	3,060	.22	2,780	114,027	4.1
1958	10,995	2,433	.22	2,181	91,711	4.2
1959	10,189	2,249	.22	1,990	85,782	4.3
1960	11,672	2,119	.18	1,978	110,138	5.6
1961	8,475	1,969	.23	1,820	69,866	3.8
1962	13,055	3,511	.27	3,384	75,489	2.2
1963	14,553	3,980	.27	3,836	77,329	2.0
1964	24,101	4,827	.20	4,691	157,451	3.4
<u>2. United States</u>						
1953	10,734	2,203	.21	2,188	93,717	4.3
1954	9,482	2,068	.22	2,051	81,323	4.0
1955	13,263	2,829	.21	2,775	112,845	4.1
1956	13,262	2,945	.22	2,801	111,478	4.0
1957	13,771	3,058	.22	2,779	114,003	4.1
1958	10,994	2,428	.22	2,176	91,474	4.2
1959	10,176	2,240	.22	1,981	85,327	4.3
1960	11,670	2,115	.18	1,975	109,747	5.6
1961	8,473	1,965	.23	1,816	69,627	3.8
1962	13,052	3,504	.27	3,377	74,898	2.2
1963	14,551	3,977	.27	3,833	77,318	2.0
1964	14,507	4,083	.28	3,947	61,539	1.6

(a) Beginning in 1964 renumbered as s.c. 439-20, "Naphtha", which includes s.c. 7163; also included in s.c. 429-99, "Industrial chemical specialties n.e.s."

Table 45

Imports: Lignosulphonates, s.c. 8417^(a)

Tariff Items 203 and 203a

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1960	12,969	366	.03	2	314	20.0
1961	14,627	368	.03	8	1,581	20.0
1962	21,239	723	.03	28	6,255	22.5
1963	15,603	619	.04	36	7,201	20.0
1964	15,164	581	.04	..	..	..
<u>2. United States</u>						
1960	12,715	355	.03	2	314	20.0
1961	14,437	359	.02	8	1,581	20.0
1962	21,030	713	.03	28	6,255	22.5
1963	15,559	617	.04	36	7,201	20.0
1964	14,870	542	.04	..	..	..

(a) Prior to 1960 included in s.c. 8104; beginning in 1964 renumbered as s.c. 399-45: "Lyes from wood pulp manufacturing"

Table 46

Imports: Automotive chemicals n.e.s., s.c. 429-11^(a)

Tariff Items 207d, 220a(i), 428g and 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1964	1,939	527	.27	524	98,548	18.8
<u>2. United Kingdom</u>						
1964	3	2	.45	2	230	14.9
<u>3. United States</u>						
1964	1,935	525	.27	523	98,318	18.8

(a) Class established in 1964

Table 47

Imports: Industrial chemical specialties n.e.s., s.c. 429-99^(a)

Tariff Items: various

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u> <u>p.c. of</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	<u>Value</u>
				(000)		
	<u>1. Total</u>					
1964	33,935	11,662	.34	8,752	1,554,606	17.8
	<u>2. United Kingdom</u>					
1964	677	189	.28	102	15,214	14.9
	<u>3. United States</u>					
1964	31,673	10,910	.34	8,137	1,460,946	18.0
	<u>4. Germany, Fed. Rep. of</u>					
1964	614	288	.47	282	48,026	17.1
	<u>5. Netherlands</u>					
1964	485	110	.23	102	9,484	9.3

(a) Class established in 1964

Table 48

Imports: Photographic chemicals n.e.s., s.c. 919-79^(a)

Tariff Items 208t, 220al and 711

<u>Year</u>	<u>Total Imports</u> \$	<u>Dutiable Value</u> \$	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1964	4,366,299	4,351,480	850,639	19.5
<u>2. United Kingdom</u>				
1964	38,041	27,717	4,131	14.9
<u>3. United States</u>				
1964	4,286,382	4,281,887	838,647	19.6
<u>4. Belgium/Luxembourg</u>				
1964	17,088	17,088	3,412	20.0
<u>5. Germany, Fed. Rep. of</u>				
1964	14,277	14,277	2,604	18.2
<u>6. Italy</u>				
1964	5,572	5,572	1,114	20.0
<u>7. Netherlands</u>				
1964	4,939	4,939	731	14.8

^(a) Prior to 1964 included in s.c. 8415

Table 1

Exports: Turpentine, s.c., 1720^(a)

<u>Year</u>	<u>Quantity</u> gal.	<u>Value</u> \$	<u>Unit</u> <u>Value</u> \$/gal.
1953	2,003	2,359	1.18
1954	939	1,278	1.36
1955	430	497	1.16
1956	863	1,314	1.52
1957	905	1,128	1.25
1958	237	475	2.00
1959	215	428	1.99
1960	-	-	-

(a) Beginning in 1961 included in s.c. 399-99

Table 2

Exports: Dipping, spraying and insecticide compounds, s.c., 8090^(a)

<u>Year</u>	<u>Value</u> \$
1953	56,263
1954	183,855
1955	55,401
1956	403,230
1957	162,244
1958	154,554
1959	16,966
1960	198,473

(a) Not available after 1960

Table 3

Exports: Agricultural chemicals, formulated, insecticides and
rodenticides, s.c. 418-99^(a)

<u>Year</u>	<u>Quantity</u> cwt.	<u>Value</u> \$	Unit <u>Value</u> \$/cwt.
1961	38,584	1,216,147	31.52
1962	30,394	873,191	28.73
1963	62,246	1,282,174	20.60
1964	14,634	347,049	23.72
1965	14,798	518,201	35.02

^(a) Not available prior to 1961

Table 4

Exports: Lignosulphonates, s.c. 8481^(a)

<u>Year</u>	<u>Quantity</u> lb.	<u>Value</u> \$	Unit <u>Value</u> \$/lb.
1960	15,188,690	595,151	.04
1961	11,458,272	573,669	.05

^(a) Not available prior to 1960. Beginning in 1961 renumbered as s.c. 399-45. Beginning in 1962 the data are included in s.c. 399-99, an n.e.s. class

Table 5

Exports: Industrial chemical specialties and explosives, s.c. 429-99^(a)

<u>Year</u>	<u>Value</u> \$
1961	4,311,649
1962	7,223,656
1963	9,033,127
1964	7,693,295
1965	7,329,059

(a) Not available prior to 1961

Table 1

Sales of pesticides, by type, selected years, 1947-64

	Calendar Year		Year Ending September 30							
	1947	1950	1953	1956	- thousand dollars -					
					1957	1958	1959	1960	1961	1962
										1963
										1964
(A) <u>Agriculture</u>										
Crop and Seed Treatments including adjuvants	3,936	4,661	6,327	7,180	7,067	7,976	9,630	9,872	12,329	13,117
Livestock Treatments excluding wormers(a)	449	353	604	1,038	882	1,204	1,224	1,404	1,818	1,955
Herbicides	1,046	5,763	5,198	5,974	6,450	5,666	7,608	8,396	10,295	11,333
Total Agriculture	5,431	10,777	12,129	14,192	14,399	14,846	18,462	19,672	24,442	26,405
(B) Household and Industrial Insecticides	1,561	2,343	3,795	4,208	4,096	4,207	5,405	5,785	7,426	6,784
(C) Rodenticides	208	167	314	323	344	349	447	511	561	482
(D) Not Specified in Detail	-	-	-	-	350	700	485	580	671	705
Total	7,200	13,287	16,238	18,723	19,189	20,102	24,799	26,548	33,100	34,376
										35,920

Sales of pesticides by Canadian registrants under the Pest Control Act; certain classes of disinfectants, such as chlorine and pine oil, are not normally handled by the Pesticides Industry and were discontinued in the D.B.S. sales data in 1950.

(a) Livestock wormers - These are regarded as pharmaceutical products, not normally handled by the Pesticides Industry

Source: D.B.S., Sales of Pest Control Products by Canadian Registrants, Catalogue No. 46-212

Table 2

Agricultural chemicals, published grower prices,
New York State vs. Ontario, 1962

Dusts and Wettable Powders

Product	Package Size	New York State Grower Prices		Ontario User Prices
		U.S. Funds Per Lb. or Unit	Can. Equiv. (a) Per Lb. or Unit	Can. Funds Per Lb. or Unit
Aldrin 5 Dust	50 lb. bag	\$ 7.75	\$ 8.14	\$ 7.45
Aldrin 20 Gran- ular	50 lb. bag	16.70	17.54	18.50
Amid-Thin W	$\frac{1}{2}$ lb. can	1.25	1.31	1.34
Captan 50-W	4 lb. bag	0.64	0.67	0.66
	2 $\frac{1}{2}$ lb. bag	2.52	2.64	-
Cyprex	4 lb. bag	-	-	2.50
DDD 50-W	4 lb. bag	0.55	0.58	0.57
DDT 5 Dust	50 lb. bag	4.00	4.20	3.90
DDT 5 Granular	50 lb. bag	5.75	6.04	5.90
DDT 50-W	4 lb. bag	0.30	0.31	0.32
Dieldrin 50-W	2 $\frac{1}{2}$ lb. bag	1.50	1.58	-
	3 lb. bag	-	-	1.58
Endrin 1 Dust	50 lb. bag	6.35	6.67	5.00
Ethion 25-W	4 lb. bag	-	-	1.00
	5 lb. bag	0.95	1.00	-
Ferbam	3 lb. bag	0.59	0.62	0.55
Fixed Copper	3 lb. bag	0.64	0.67	0.53
Fixed Copper Dust	50 lb. bag	6.80	7.14	5.20
Fixed Copper 7 DDT 3 Dust	50 lb. bag	7.45	7.82	5.95
Lead Arsenate	4 lb. bag	0.29	0.30	0.30
Lindane 25-W	3 lb. bag	-	-	1.10
	5 lb. bag	1.58	1.66	-
Malathion 4 Dust	50 lb. bag	6.85	7.19	6.35
Malathion 25-W	4 lb. bag	0.55	0.58	0.58
Methoxychlor 50-W	4 lb. bag	0.85	0.89	0.75
Ovatan 50-W	4 lb. bag	-	-	1.09
	5 lb. bag	1.08	1.13	-
Parathion 15-W	3 lb. bag	-	-	0.52
	5 lb. bag	0.49	0.52	-
Phygon	2 $\frac{1}{2}$ lb. bag	2.10	2.21	-
	4 lb. bag	-	-	1.90
Rotenone 1 Dust	50 lb. bag	7.00	7.35	6.70
Rotenone 5-W	1 lb. bag	-	-	0.53
	5 lb. bag	0.48	0.50	-

Table 2
(Cont'd)Dusts and Wettable Powders

<u>Product</u>	<u>Package Size</u>	<u>New York State Grower Prices</u>		<u>Ontario User Prices</u>
		<u>U.S. Funds</u> Per Lb. or Unit	<u>Can.Equiv. (a)</u> Per Lb. or Unit	<u>Can. Funds</u> Per Lb. or Unit
Sevin 50-W	4 lb. bag	\$ -	\$ -	\$ 1.00
	5 lb. bag	1.00	1.05	-
Sinox G-100	50 lb. bag	13.00	13.65	13.50
Tedion 25-W	4 lb. bag	-	-	1.80
	5 lb. bag	1.65	1.73	-
Thiodan 3 Dust	50 lb. bag	8.30	8.72	7.50
Thiodan 50-W	4 lb. bag	-	-	1.95
	5 lb. bag	2.06	2.16	-
Trithion 25-W	5 lb. bag	0.95	1.00	0.97
Zineb 75-W	3 lb. bag	0.75	0.79	0.78
Ziram	3 lb. bag	0.74	0.78	0.67

(a) U.S price times 1.05, to nearest cent

Agricultural chemicals, published grower prices,
New York State vs. Ontario, 1962

Liquid and Emulsions									
Product	Basis of Comparison				New York State			Ontario	
	Container		Lb. Active		Grower Prices		Price per Gal/unit	Grower Prices	
	Size (gal.) U.S.	Can.	U.S.	Can.	Price per Gal/unit	Price per(a) Lb.Active		Price per Gal/unit	Price per Lb.Active
Aldrin 2 E.C.	5	5	2.0	2.0	\$ 4.25	\$ 2.13		\$ 3.80	\$ 1.90
DDT 25 E.C.	5	5	2.0	2.5	1.75	0.88		1.97	0.79
Elgetol	1	128oz.	-	-	3.55	-		3.50	-
Endrin 2 E.C.	5	5	1.6	2.0	9.85	4.93		8.85	4.43
Ethion 4 E.C.	5	5	4.0	4.0	14.95	3.76		17.90	4.48
Glyodin	54	45	-	-	167.40	-		168.30	-
Heptachlor									
2 E.C.	5	5	2.0	2.0	4.25	2.13		3.80	1.90
Malathion									
5 E.C.	5	5	5.0	5.0	9.10	1.82		12.60	2.52
Nabam	30	25	-	-	45.00	-		48.75	-
Sinox P.E.	30	25	-	-	155.40	-		152.50	-
Systox	1	128oz.	-	-	19.95	-		20.50	-
TEPP	1	1	-	-	13.15	15.80(b)		22.90	-
Thiodan 2 E.C.	5	5	2.0	2.0	8.76	4.38		8.50	4.25

(a) U.S. price, times 1.05 to nearest cent

(b) U.S. price adjusted to equivalent U.S. price for one imperial gallon

Source: Seven Pesticides Manufacturers, Letter to Tariff Board, November 26, 1962

APPENDIX IIPrincipal Relevant Recommended Items

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
R-27	*584 - Bone pitch, crude only	Free	Free	Free
R-28	*585 - Coal and burgundy pitch; coal tar, crude, in packages of not less than fifteen gallons	Free	Free	Free
R-29	590 - Naphtha, high flash	Free	Free	Free
38.02	Animal black (for example, bone black and ivory black), including spent animal black	Free	Free	Free
38.03	Activated carbon (decolourising, depolarising or adsorbent); activated diatomite, activated clay, activated bauxite and other activated natural mineral products:			
	(1) Other than the following	Free	Free	Free
	(2) Activated clay	10	15	25
38.04	Ammoniacal gas liquors and spent oxide produced in coal gas purification	10	15	25
38.05	Tall oil	Free	Free	Free
38.06	Concentrated sulphite lye	10	15	25
38.07	Spirits of turpentine (gum, wood and sulphate) and other terpenic solvents produced by the distillation or other treatment of coniferous woods; crude dipentene; sulphite turpentine; pine oil (excluding "pine oils" not rich in terpineol)	Free	Free	Free
38.08	Rosin and resin acids, and derivatives thereof other than ester gums included in Recommended Item 39.05; rosin spirit and rosin oils	Free	Free	Free
38.09	Wood tar; wood tar oils (other than the composite solvents and thinners falling within Recommended Item 38.18); wood creosote; wood naphtha; acetone oil	Free	Free	Free

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
38.10	Vegetable pitch of all kinds; brewers' pitch and similar compounds based on rosin or on vegetable pitch; foundry core binders based on natural resinous products	Free	Free	Free
38.11	Chemicals for use exclusively as, and preparations compounded exclusively for use as disinfectants, insecticides, fungicides, herbicides, anti-sprouting products, rodenticides or otherwise in combatting pests of a plant or animal nature; all the foregoing subject to such regulations as the Minister may prescribe	Free	Free	Free
38.12	Prepared glazings, prepared dressings and prepared mordants, of a kind used in the textile, paper, leather or like industries:			
	(1) Other than the following	10	15	25
	(2) Preparations of this item having the quality of starch per pound	1¢	1¢	2¢
	(3) Prepared mordants	Free	Free	Free
	(4) Rosin sizing	5	7½	10
38.13	Pickling preparations for metal surfaces; fluxes and other auxiliary preparations for soldering, brazing or welding; soldering, brazing or welding powders and pastes consisting of metal and other materials; preparations of a kind used as cores or coatings for welding rods and electrodes	10	15	25
38.14	Anti-knock preparations, oxidation inhibitors, gum inhibitors, viscosity improvers, anti-corrosive preparations and similar prepared additives for mineral oils:			
	(1) Other than the following	10	15	25
	(2) Anti-knock preparations of tetraethyl lead or tetramethyl lead in which tetraethyl lead or tetramethyl lead or a mixture of both is the preponderant constituent by weight	5	10	25
38.15	Prepared rubber accelerators	10	15	25

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
38.16	Prepared culture media for development of micro-organisms	Free	Free	Free
38.17	Preparations and charges for fire-extinguishers, not including charged fire-extinguishing grenades	10	15	25
38.18	Composite solvents and thinners for varnishes and similar products	10	15	25
38.19	Chemical products and preparations of the chemical and allied industries (not including those consisting of mixtures of natural products other than compounded extenders for paints), n.o.p.; residual products of the chemical or allied industries, n.o.p.; not including soap nor pharmaceutical, flavouring, perfumery, cosmetic or toilet preparations:			
	(1) Other than the following	10	15	25
	(2) Alkyl aryl hydrocarbons, unsulphonated reaction blends	5	10	25
	(3) Anti-freezing compounds	15	15	25
	(4) Blends of tall oil and tall oil pitch without other admixture	Free	Free	25
	(5) Catalyst preparations for cracking petroleum, other than the fluid-bed type	Free	Free	25
	(6) Coal tar dye intermediates in solvents	Free	Free	15
	(7) Fusel oil	Free	Free	15
	(8) Hydrolized animal matter for use as retarder	10	10	25
	(9) Mixtures of ethylene glycol and other glycols in which ethylene glycol predominates, for use in the manufacture of anti-freezing compounds	10	10	25
	(10) Naphthenates of aluminum, barium, calcium and chromium	Free	15	25
	(11) Residual lyes from the manufacture of wood pulp by the alkali or sulphate processes and their skimmings, dried or not	Free	Free	25
	(12) Tin-based stabilizers for synthetic resins	Free	Free	25

APPENDIX III

Seven manufacturers of pesticide formulations, list of biologically active chemicals for use in the manufacture of goods described by Brussels Heading No. 38.11, revised to January 3, 1963

<u>B.T.N.</u> <u>Heading</u>	<u>B.T.N.</u> <u>Heading</u>
12.07 Pyrethrum	29.07 Dichlorophenyl benzene sulphonate
13.02 Cube Resins	Dinex
28.11 Arsenic Acid	Dinoseb
	D.N.C.
28.30 Copper Oxychloride	29.08 Methoxychlor
28.38 Ferrous Sulphate	29.09 Dieldrin
Thallium Sulphate	Endrin
Tribasic Copper Sulphate	29.10 Piperonyl Butoxide
Zinc Sulphate	
28.44 Potassium Cyanate	29.11 Metaldehyde
28.46 Borax	29.13 Chlordanil
Sodium Metaborate	Dichlone
28.48 Ammonium Sulphamate	Pindone
28.55 Zinc Phosphide	29.14 Allethrin
29.02 Aldrin	Dinitro capryl phenyl crotonate
B.H.C.	Erbon
Chlordane	Pyrethrin I
Dichlorodiphenyl Dichloro- ethane	Sodium Dichloropropionate
D.D.T.	Sodium Naphthalene Acetate
Ethylene Dibromide	Sodium Trichloracetate
Heptachlor	Trichlorobenzoic Acid
Hexachlorobenzene	29.15 Dimethyl Phthalate
Lindane	Pyrethrin II
Methyl Bromide	29.16 Chloromethyl phenoxy butyric acid
29.03 Chlorfenson	2,4-Dichlorophenoxy butyric acid
Pentachloro Nitrobenzene	Esters of 2,-4-Dichloro- phenoxy-butyric acid
29.04 Ethylhexanediol	Esters of Silvex
29.05 Bis(p-chlorophenyl) tri- chloroethanol	M.C.P.A. Acid
29.06 Phenyl phenol and its salts	Mecoprop
	Silvex
	29.17 Sodium 2,4-dichlorophenoxy- ethyl sulphate

B.T.N.
Heading

- 29.19 Dichlorvos
Dimethyl carbomethoxy
propenyl phosphate
Dimethyl-1,2-dibromo
-2,2-dichloroethyl
phosphate
T.E.P.P.
- 29.21 Butylphenoxy Isopropyl
chloroethyl sulphite
Diethyl dichlorophenyl
thiophosphate
Dimethyl trichloro phenyl
thiophosphate
Dioxane bis (diethyl
dithio phosphate)
Parathion
- 29.22 Butylchlorophenylmethyl
methyl phosphoramidate
Dichlorophenyl methyl
isopropyl phosphoramido-
thioate
- 29.23 Amino dichlorobenzoic
acid
Phenylamino cadmium
dilactate
2,4,5-Trichlorophenoxy
propionic acid-triethanol-
amine salt
- 29.25 Chloro butynyl chloro-
carbanilate
Chlorodiallyl acetamide
Chloromethylphenyl methyl-
pentanamide
Chlorophenyl dimethylurea
trichloracetate
Dimethylaminoxyl methyl
carbamate
Diuron
Fenuron
Isopropyl chlorocarbanilate
Methyl naphthyl carbamate
Monuron
Naphthyl acetamide
Naphthylphthalamic acid
Phenyl dimethylurea
trichloracetate

B.T.N.
Heading

- 29.25 Phosphamidon
(Cont'd) Prophan
- 29.26 Dodine
N-octyl bicycloheptene
dicarboximide
- 29.31 2-Butoxy-2-thiocyano
diethyl ether
Captan
Chloroallyl diethyl dithio-
carbamate
Demeton
Dichloroallyl diisopropyl-
thiol carbamate
Diethyl p-chlorophenyl-
thiol methyl dithio-
phosphate
Diethyl ethylthioethyl
dithiophosphate
Ethion
Ferbam
Isobornyl thiocyanacetate
Malathion
Maneb
Sodium methylldithio-
carbamate
Tetrachlorodiphenyl sulphone
Trichloroallyl diisopropyl-
thiol carbamate
Trichloromethyl thiophthal-
imide
Zineb
Ziram
- 29.32 Disodium methanearsonate
- 29.33 Ethyl mercury chloride
Methyl mercury nitrile
Phenyl mercury acetate
Phenyl mercury chloride
Phenyl mercury formamide
Phenyl mercury triethanol
ammonium lactate
- 29.34 Trichlorfon
- 29.35 Bis butenylene tetra-
hydro furfural
Butopyronoxyl
Chlorbis (ethylamino)
triazine

B.T.N.
Heading

29.35 2-Chloro-4-ethylamino
(Cont'd) -6-isopropylamino-
s-triazine
"Diazinon"
Dichloro chloranilino
triazine
Diethyl chloromethyl-
coumarinyl thiophos-
phate
Dimethyl diaminotria-
zinylmethyl dithio-
phosphate
1:1'-Dimethyl-4,4'-
dipyridylum di-
chloride
Dimethyl oxobenzo triaz-
inomethyl dithio-
phosphate
Dimethyl tetrahydro
thiadiazine thione
Dipropyl iso cinch-
omerone
1:1'-Ethylene-2:2'-
dipyridylum di-
chloride
Glyodin
Methyl mercury oxinate
Rotenone
Thiodan

B.T.N.
Heading

29.42 Strychnine
29.44 Streptomycin and its salts
29.45 Paris Green
38.19 Bis (dialkyl phosphino-
thiyl) disulphides
Butoxy polypropylene
glycol
Copper oxychloride
sulphate
"Strobane"
Toxaphene

Source: Transcript, Vol. 108, p. 16335-6, as revised to January 3,
1963

LIST OF COMPANIES SHOWING INTEREST IN GROUPS
OR DIRECTLY IN B.T.N. 38.11

<u>Company</u>	<u>Address</u>
A.H. Howard Chemical Company Limited	Orangeville, Ont.
Allied Chemical Services Ltd.	Calgary, Alta.
Chipman Chemicals Limited	Hamilton, Ont.
Gallowhur Chemicals Canada Limited	Lachine, Que.
Manchester Products Limited	Galt, Ont.
Niagara Brand Chemicals	Burlington, Ont.
Green Cross Products	Montreal, Que.
Naugatuck Chemicals	Elmira, Ont.
S.C. Johnson & Son Limited	Brantford, Ont.
Colgate-Palmolive Limited	Toronto, Ont.
Canada Rex Spray Co. Limited	Brighton, Ont.
Aerocide Dispensers Ltd.	Rexdale, Ont.
P. Leiner & Sons (Canada) Limited	Toronto, Ont.
Cartier Chemical Co. Limited	Lachine, Que.
Natural Products Corporation	Montreal, Que.
Shulton of Canada Limited	Don Mills, Ont.
Connecticut Chemicals (Canada) Limited	Toronto, Ont.
Nopco Chemical Canada Ltd.	Hamilton, Ont.
Chemical Specialties Association	Sarnia, Ont.
Nuodex Products of Canada Limited	Toronto, Ont.
Labatt Industries Limited	London, Ont.
McArthur Chemical Co. Ltd.	Montreal, Que.
Witco Chemical Company Canada Ltd.	Toronto, Ont.
Cobalt Refinery Limited	Cobalt, Ont.
Kent Chemicals Ltd.	Vancouver, B.C.
Javex Company Limited	Toronto, Ont.
Shell Oil Company	Toronto, Ont.
Thomas Rostron & Company	Montreal, Que.
Moran Chemical Company Limited	Montreal, Que.
Anchor Cap & Closure Corporation of Canada Limited	Toronto, Ont.
Dominion Glass Company Limited	Montreal, Que.



Report by

THE TARIFF BOARD

Relative to the Inquiry Ordered
by the Minister of Finance
respecting

CHEMICALS

VOLUME 14

**ARTIFICIAL RESINS AND PLASTICS IN HEADINGS
39.01 AND 39.02
OF THE BRUSSELS TARIFF NOMENCLATURE**



Reference No. 120



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THE TARIFF BOARD

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by the Minister of Finance
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CHEMICALS



VOLUME 14

**ARTIFICIAL RESINS AND PLASTICS IN HEADINGS
39.01 AND 39.02
OF THE BRUSSELS TARIFF NOMENCLATURE**



Reference No. 120

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The Honourable Mitchell Sharp, P.C., M.P.
Minister of Finance
Ottawa

Dear Mr. Sharp:

I refer to Mr. Harris' letter of September 21, 1956 and to Mr. Fleming's letters of October 11, 1957 and December 21, 1959 in which the Tariff Board was requested to conduct an inquiry respecting chemicals.

In conformity with Section 6 of the Tariff Board Act, I have the honour to transmit Volume 14 of the Report of the Board, in English and in French. This volume contains the report on artificial resins and plastics in Headings 39.01 and 39.02 of the Brussels Tariff Nomenclature. Volume 15 will be forwarded to you as soon as it has been completed.

Yours sincerely,

A handwritten signature in dark ink, appearing to read "L. C. Audette", followed by a long, horizontal, wavy flourish.

Chairman

Explanation of Symbols Used

- Denotes zero or none reported
 - .. Indicates that figures are not available
 - * In statistical tables, indicates a reported figure which disappears on rounding, or is negligible
 - (a) A small letter in brackets denotes a footnote to a table
 - (1) A number in brackets denotes a footnote to the text
 - s.c. Denotes a Dominion Bureau of Statistics import or export statistical class
-

The sum of the figures in a table may differ from the total, owing to rounding

A Note on the Organization of the Report - Reference 120

The first four volumes of the Report by the Tariff Board respecting Reference 120, Chemicals, relate to the reference as a whole; the eleven volumes which follow (Volumes 5 to 15, inclusive) relate to the products which were the subject of the Board's inquiry. The principal subject matter of each of the volumes is given below in terms of the headings of the Brussels Tariff Nomenclature (B.T.N.). Occasionally, chemicals of different B.T.N. Headings are dealt with together, for example, chlorine (28.01) and caustic soda (28.17); the more detailed tables of contents of the individual volumes indicate where this occurs.

To the extent that particular statistical tables could be related to specific products or B.T.N. headings they are included in the statistical appendix of the volume which deals with that product or heading. Some tables, which could be related only to broader groupings of chemicals, are included in the statistical appendix to the last volume dealing with such broader groupings: inorganic chemicals in Volume 7, organic chemicals in Volume 9 and artificial resins and plastics in Volume 15.

Because of the unprecedented amplitude and complexity of Reference 120 - Chemicals, many parts of Volumes 5 to 15 were written a considerable time before the first four volumes. This gives rise, occasionally, to apparent discrepancies, attributable to the passage of time, particularly between Volume 4 and those which follow.

Table of Contents for Volumes 1 to 15, inclusive

General Volumes

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1	Recommended Schedule
2	Goods in Recommended Items
3	Goods in Existing Items
4	General Considerations; Summary and Conclusions

Reports on Products

Volume

General Description

B.T.N. Headings

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6	Inorganic Chemicals	26.03 and 28.18 to 28.34
7	Inorganic Chemicals	25.32 and 28.35 to 28.58
8	Organic Chemicals	15.10, 15.11, 22.08, 22.09 and 29.01 to 29.13
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13	Misc. Chemicals & Preparations	37.08 and 38.02 to 38.19
14	Artificial Resins & Plastics	39.01 and 39.02
15	Artificial Resins & Plastics; Other Portions of Reference 120	39.03 to 39.07

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* The numbers shown after product designations are those used in the Brussels Tariff Nomenclature

ARTIFICIAL RESINS AND PLASTIC MATERIALS

B.T.N. 39

INTRODUCTION

The production of plastics is one of the world's major industries and a greater volume of plastics is now consumed annually than of all the non-ferrous metals combined. It is a relatively new industry which, in the past quarter of a century, has experienced a truly remarkable degree of expansion. World production, which in 1938 was approximately 650 million pounds, had risen to more than 3 billion pounds in 1950 and by 1960 was in excess of 15 billion pounds -- a compound growth rate averaging over 14 per cent per annum. This compares with a growth rate over the same period of about 9 per cent for the aluminum industry and just under 5 per cent for steel.⁽¹⁾

Plastics represent, perhaps more than any other contemporary manufacture, the wonder and complexity of our highly technological age. As a result of their development, the limitations imposed by nature on the materials available for man's use have been transcended, and the means at hand for shaping man's environment to meet his needs vastly increased. Modern science, utilizing chemicals derived from such natural resources as coal, oil and natural gas, has reconstituted their basic molecular structure and created original substances with distinctive properties all their own. Initially conceived as substitutes for more costly conventional materials, these synthetic products are now carving out areas of application where none existed before. And, as their complex chemistry becomes more adequately understood, new plastics are being tailor-made to meet specific requirements and standards that no natural substance could attain. They have become an essential element in modern living and are to be found everywhere across the wide spectrum of industrial production; from aeroplanes to automobiles, from toys to textiles, their range of use continues to broaden and expand. Light, strong, tough, susceptible to a wide range of colouration, readily adaptable to mass-production techniques and relatively low in price, the unique advantages offered by these products of human ingenuity suggest that, notwithstanding its recent and rapid growth, the plastics industry is only on the threshold of an era of spectacular development.

The history of the industry goes back less than one hundred years to the development of cellulose nitrate in 1868. This new material, known as celluloid, was very largely the product of a search for a cheap and plentiful substitute for the scarce and expensive ivory used in billiard balls, but it soon proved adaptable to a wide variety of other uses including dentures, photographic film, knife handles, combs, collars, cuffs and shirt fronts. The name celluloid, in fact, became virtually synonymous in the public mind with plastic and it has been, until quite recently, by far the best known of all plastic materials.

(1) National Institute Economic Review, No. 26, Nov. 1963, p. 23-4

Some forty years after the advent of cellulose nitrate, the second major development in the industry took place with the successful formulation of a phenol formaldehyde resin in 1909. This first synthetic polymer, called bakelite after its discoverer, Dr. Leo H. Baekeland, became established in a broad range of applications and, as a moulding material, proved to be of particular importance in the development of the electrical industry. The outstanding success of bakelite quickened the pace of research and development in the synthetics field and, as a result, new plastics began to make their appearance in the market with some considerable regularity. Among the more significant advances have been the development of the alkyds and polyvinyl chloride in the nineteen twenties, nylon, acrylic and polystyrene in the thirties, and polyesters, polyethylene, silicones and epoxies in the forties; three of these, polyvinyl chloride (PVC), polystyrene and polyethylene now account for over half of the world's total plastics output. Today there are about twenty-five major families of plastics in commercial use and, within these broad categories, new and distinctive products continue to pour forth in a seemingly never-ending stream from the laboratories of the industry. Such names as acrylonitrile-butadiene-styrene (ABS), methyl methacrylate styrene maleic anhydride copolymer, and polytetrafluoroethylene attest to the growing complexity of the world of synthetic plastics.

Plastics are organic chemical compounds which, aside from a few polymers such as the cellulose and proteins, are produced by synthesis from basic hydrocarbons. The process involved is generally known as polymerization -- a reaction employing heat, pressure and usually a catalyst, in which single molecules in the raw material are linked together to form chains of larger and heavier molecules with characteristics quite different from the original monomer. These giant, or macro, molecules obtained by polymerization constitute the basic structure of a wide and varied group of products which are characterized by their capacity to become pliable at some stage in their manufacture and, with the application of heat or pressure or both, to be formed into solid shapes.

No single definition of plastics has been universally accepted. The word is sometimes used so broadly as to include many materials (for example, glass) not under consideration here. Another usage restricts the term to the cellulosic polymers and, possibly, the hardened proteins, in distinction to the polymers from hydrocarbons, referred to as "synthetic resins". In general, in this report the word "plastics" is used to refer broadly to all of the polymers of Chapter 39 of the Brussels Nomenclature. When the term "synthetic resins" is used it refers to polymers from hydrocarbons. Reference to particular types is specifically made where necessary. Synthetic rubbers, or elastomers, are similar to plastics but are not part of Reference 120. In the Brussels Nomenclature the distinction between plastics and synthetic rubbers is made basically on the degree of elasticity. This report generally adopts the classification of that Nomenclature.

Plastics are customarily classified as either thermosetting, which are fixed in a permanent form, or thermoplastic which may be softened and reshaped repeatedly by the application of heat. The phenolics and polyesters are examples of thermosetting materials while the thermoplastic group, which is by far the larger, includes the polyvinyls, the polystyrenes, the polyolefins (polyethylene and polypropylene) and the cellulose. In number and characteristics, the range of plastics can be extended almost infinitely by such processing techniques

as the variation of heat and pressure during polymerization, the copolymerization of separate monomers, or the blending of different resins.

The process of turning the basic raw material monomers such as ethylene, styrene or vinyl chloride into a finished plastic product is a complex, and often lengthy, operation. Production of the primary resin is the first step in this process; following polymerization most resins are compounded with other materials to obtain specific characteristics designed to meet particular requirements. Among the more common additives used in making compounds are plasticizers to make the plastic more flexible; stabilizers to increase the resistance of the plastic to the adverse effects of such factors as heat, cold, light and air; fillers to add bulk, change characteristics and reduce costs; and colourants. The basic resins and compounds, usually in the form of granules, powder or liquid, may be used directly in the formulation of paints, adhesives and similar products, or processed by various means into sheets, rods, tubes and other articles. The principal processing techniques employed by the industry are moulding, extrusion, casting, calendering, printing, decorating, coating, laminating and reinforcing.

Injection moulding, the most commonly used method in the manufacture of thermoplastic products, requires that the resin be fed into a heating chamber, subjected to pressure by a revolving screw, melted and then forced out of a nozzle at high pressure into a cold mould. With blow moulding, another method used for processing thermoplastic resins, air is introduced into a mould containing softened resin so as to inflate the material and produce a hollow, contoured product taking the pattern of the mould. Compression moulding, which is generally employed for thermosetting plastics, involves the application of heat and pressure to the resin in a closed mould until it cures or sets. In a variation of this technique, known as transfer moulding, the plastic is preheated to a liquid state and then forced under pressure into the mould.

Extrusion, the process most often adopted for the production of film, sheeting, rods, tubes and other profile shapes, requires that the resin be plasticized in a heated barrel and then forced out by a revolving screw through a slot or die shaped like the finished product. Casting, unlike the processes mentioned above, does not involve the use of pressure and the resin when liquified is simply poured into a mould or, as in the case of film, on to a moving belt where it is cooled and stripped off. Calendering, another technique for making film and sheet, entails the passing of the resin compound through a series of heated rollers where it is thoroughly worked and finally squeezed out in the form of film.

The coating of materials such as wood, metal and paper with plastic is done by a number of methods which include dipping, spraying, brushing and a rolling process similar to that of calendering. The technique of laminating employs high heat and pressure to create a bond between the plastic, usually a thermoset, and a reinforcing substance like wood or fibres of glass or another plastic. Reinforcing, as a means of processing plastics, differs from laminating in that little or no pressure is used in bonding the plastic with the strengthening material.

A final processing stage, that of fabricating, is sometimes necessary before the plastic article becomes a fully finished product. These fabricating functions are comparable to the finishing techniques employed in the manufacture of wood, paper or metal products and may include such operations as machining, cutting and forming to pattern, heat sealing, and welding. Plastic surfaces may be printed or otherwise decorated.

General Features of the Plastics Industry

The plastics industry is generally considered to be made up of a primary sector, comprising a comparatively small number of firms which manufacture the basic resins, compounds and simple sheets, and a secondary sector which includes a relatively large number of processors and fabricators who produce the semi-finished and finished products. Description of the industry, however, is complicated by the fact that a number of companies are only partly in the manufacture of plastics, while carrying on other industrial activities; some companies produce only primary forms, others produce only manufactured articles, while many are integrated through a range of products and processes. As a whole, the industry tends to become increasingly heterogeneous as it moves from primary to secondary operations and increasingly difficult to distinguish with any reasonable degree of clarity; examination of the industry, therefore, generally focuses on its primary aspects.

Among the more characteristic features of the plastics industry as a whole is the extremely dynamic market environment within which it operates. New products are continually making their appearance while improved processes, sparked by technological advances, are constantly upgrading the properties of established plastics, or lowering their costs of manufacture. Competition between different plastics is very keen since, although particular properties often vary significantly from one material to another, there are fairly broad areas of substitutability within which considerations of price determine which will be employed. Polyethylene, polypropylene and polystyrene, for example, all compete in the area of moulded articles such as housewares, toys and similar products. As film, polyethylene and polypropylene along with polyvinylidene chloride and cellophane contend vigorously for shares of the lucrative consumer goods packaging market. Nylon polyesters, acrylics and polypropylene are all used as textile fibres. Suitable protective coverings for wire and cable may be manufactured from a number of different resins. The market for pipe, traditionally a preserve of the metal and ceramic industries, was initially invaded by polyethylene and is now being shared by other plastics such as rigid PVC and ABS. Competition, of course, is not limited to other plastics; those industries producing materials such as wood, paper, leather, glass, rubber and metal which have seen their markets increasingly affected by plastics are continually striving to improve their products and re-establish their former position, often with considerable success. Whether this degree of intense competition will gradually diminish as the plastics industry matures and its principal products find a relatively stable position in the hierarchy of materials required by a modern industrial society is conjectural, but as yet there are no indications that such a time is at hand. In the meantime conditions in the industry can be expected to remain very dynamic, with a rapid rate of technological obsolescence, a constant downward pressure

on prices and costs and a substantial movement in to and out of the processing and fabricating sector of the industry; the rate of return on invested capital can be expected to vary markedly from time to time and from country to country.

One other aspect of the extremely competitive plastics market is the tendency it creates toward overcapacity in productive facilities. Because the production of synthetic resins is a highly technical and capital intensive operation, unit costs, at least up to a point, can be lowered significantly by increasing the scale of output and this offers an inducement for producers to expand beyond the needs of their existing markets on the assumption that any surplus may be disposed of in other markets at, if necessary, prices that will simply cover out-of-pocket costs. A senior official of a large Canadian resins producer has been quoted as saying:

"We never build a plant for the sake of entering the export field. We build for what we expect Canadian consumption will be in 10 years' time. Any excess production before that estimate is reached we try to export."⁽¹⁾

Another factor leading towards overcapacity in the industry was explained to the Board in these words:

"A plant may be designed for a given capacity and so installed and then technological changes in polymerization may give a technological increase in the capacity without further plant investment or major change; and, therefore, the plans of a company are carried ahead further by their research than they really planned to move at a given time."⁽²⁾

In addition, capacity is increased because the high degree of substitution of one plastic for another tends to lead, in the aggregate, to some over estimation of the available market for particular products.

Tendencies towards overcapacity are, of course, not unknown in other industries and, for plastics, the threat has remained largely latent as global demand continues to expand so rapidly. It is, however, a threat of considerable real concern to the industry and one which was strongly emphasized in the numerous views expressed to the Board on this issue.

The highly technical nature of plastics manufacturing and the extremely competitive conditions under which the products are marketed have combined to render the role of research of particular importance to this industry. One study has concluded that the degree of predominance that a country obtains in the production and export of plastics is directly related to its degree of technical progress in the field and that this, in turn, is primarily a function of the level of expenditures on research.⁽³⁾ The leadership of the U.S.A. and Germany in the plastics field is explained, according to the study, by the intensive

(1) Financial Post, Nov. 21, 1964, p. 11

(2) Transcript, Vol. 153, p. 22721

(3) Economic Review of the National Institute of Economic and Social Research, No. 26, November 1963, p. 22

research efforts with respect to both the production and use of synthetic resins which have characterized the industry in both these countries. This emphasis on research has been reflected in the number of patents issued and in the rapid adoption of new developments and has more than offset any relative disadvantages which these countries may have had in terms of raw material, labour or capital costs. Production per capita was estimated for 1961 to be about 39 pounds for the U.S.A. and 42 pounds for West Germany compared with something like 25 pounds for the U.K., 18 pounds for Japan and slightly less than 18 for France. (Canada's per capita production figure was of the same order as that of Japan and France). The leadership of the U.S.A. and Germany is also apparent on the consumption side with per capita U.S. consumption of 34 pounds, and West Germany's just under that level, compared with about 21 pounds for the U.K., 19 for Japan, 18 for France and 20 for Canada. Although the data are not readily available to demonstrate it, undoubtedly per capita production and consumption in all industrial countries have increased substantially since these comparisons, based on 1961 data, were made.

The gist of this study of the role of research expenditures in the plastics industry is that the nature of these man-made products dictates that research and development are fundamental to the growth of production and consumption and exceed in importance all other factors. Some idea of the scale of such expenditures is given by Du Pont's recent development of a new plastic material for the manufacture of shoes which has been commented upon as follows:

"Its investment in Corfam already exceeds at today's costs, the some \$25 million risked on nylon before there was any return on that investment."⁽¹⁾

A Canadian view on the role of research is contained in the following quotation:

"Research is the backbone of the plastics business. It has been estimated that for a company to remain in this highly competitive business, the average cost per technical man per year is from \$25,000 to \$35,000. Each major producer must maintain a technical and research staff of approximately 90 to keep pace with the market and its competitors."⁽²⁾

Large-scale research expenditures require large-scale production, particularly at the basic resin stage, and it is customary, therefore, for the primary forms to be produced by the large chemical or petroleum companies operating complex facilities turning out many products, usually on a large scale. Within the complex, on the other hand, the particular material probably will be made in a specialized plant.

Moreover, the company that is producing the polymer in large quantities is likely to seek assured outlets for the product by establishing facilities at the secondary stage to process the basic material into final products, for example, paints, housewares, building products, industrial parts and packagings. Thus, part of the company's

(1) Fortune Magazine, Nov., 1964, p. 172

(2) Can. Chem. Processing, Nov., 1962, p. 35

output of basic resin may be sold and part, perhaps a very large part, used captively by the company in more processed shapes and forms or in final products. The secondary industry, therefore, consists in part of the large-scale producers of primary resins and in part of a large number of smaller firms perhaps using a variety of different types of resins purchased in relatively small quantities from many suppliers. In addition, there are other large-scale plants in the consuming industries, such as paints, electrical wire and cable, textiles, consumer goods and packaging which have very substantial requirements of one or more of the resins; this demand they may serve either by being a very important customer to some basic producer or by setting up facilities to process their own basic materials.

All of these complex arrangements, with many more, are constantly changing within the industrial structure, adding to the problems of the producers in their efforts to assess the situation and adding to the difficulties of trying to measure statistically capacity, production and commercial trade for these products and what the developments are going to be in the future.

The Industry in Canada

Canada, in 1964, was ranked eighth among the world's producers of plastics on the basis of an estimated output of 440 million pounds which compared with a global total of 23,700 million pounds.⁽¹⁾ This estimate of Canadian production is somewhat lower than the 506 million pounds estimated by Canadian Plastics. The estimate by Canadian Plastics, in turn, does not include captive production for own use which might add another 150 million pounds of actual production. The U.S.A. was by far the largest producer with 9,700 million pounds, followed by West Germany, Japan, and Britain in that order.

As in most of the producing countries, the plastics industry in Canada is almost entirely a post-war phenomenon. Production was relatively insignificant prior to 1939 and it was the impact of war-induced shortages and the need to find substitute materials that led to the initial development of large scale manufacturing operations. After the war, the availability of plentiful supplies of raw materials -- initially, monomers such as styrene from the domestic synthetic rubber industry and later a wide range of petrochemicals derived from the new oil and gas resources of Western Canada -- coincided with an increasing consumer acceptance of synthetic materials and resulted in the rapid growth in productive facilities which is still going on. By 1948, there were ninety-one establishments engaged in the manufacture of plastics; 12 were classified to the primary plastics industry with a gross value of production of \$16 million, while 79 were identified with the secondary activities of processing and fabricating and their output was reported as \$14 million. The industry had grown to three hundred and twenty-eight establishments in 1963; the primary sector numbered 29 with a value of shipments of \$139 million and there were 299 establishments in the secondary sector, with shipments valued at approximately \$145 million.⁽²⁾ In addition to these shipments credited to the industry itself, there were very many companies scattered through other industries

(1) Modern Plastics, February 1965, p. 74

(2) D.B.S., Cat. Nos. 46-211 and 47-208

which employ plastics in the manufacture of their products; the value of the plastics sold by these firms was estimated at about \$200 million in 1963.⁽¹⁾ Moreover, the production of the polymers has supported large volume production of the cellulosic and hydrocarbon raw materials and of the necessary chemicals and other supplies.

Employment in the plastics industry, in 1963, was about 13,000 with slightly more than 3,600 in the primary sector and the rest in the processing and fabricating field. The total wage bill was some \$56 million.⁽²⁾ Geographically, the industry was very much concentrated in Central Canada. Of the twenty-nine primary establishments in operation in 1963, only seven plants, were outside Ontario and Quebec; three of these were in British Columbia and four were in Alberta. Processors and fabricators were more dispersed, six being located in the Maritimes, thirty-one on the Prairies, twenty-two in British Columbia and the remaining two hundred and forty in Central Canada.

The primary resin producers have, in the main, located in close proximity to the petroleum refinery operations of Central Canada which provide their principal raw materials and are also conveniently situated in relation to Canada's major markets; Sarnia, Ont., and Montreal, Quebec, are the main producing centres. C.I.L.'s polyethylene plant at Edmonton, using the plentiful natural gas supplies in that area to obtain its ethylene requirements, is a notable exception to the general concentration in Central Canada, as are the phenol-formaldehyde producers located in B.C. near their major markets in the plywood industry. Economically, as well as geographically, the manufacture of primary resins in Canada tends to be very closely associated, and even sometimes integrated, with the production of petrochemicals, the principal raw materials. Resin manufacture, particularly with respect to the large-volume thermoplasts such as polyethylene and polyvinyl chloride, is a large-scale operation involving the investment of substantial amounts of capital and the employment of highly skilled labour. Most of the companies engaged in this field in Canada are foreign owned, or controlled, the majority being subsidiaries of U.S. corporations.

Unlike the primary producers, the processors and fabricators are not tied geographically to the petroleum refiners and are most often to be found in and around large cities which constitute their principal markets. They differ also in that they ordinarily require investment on a much more modest scale and the majority of the firms involved are relatively small in size; many are Canadian owned. At the same time it is apparent that in recent years there has been a definite trend on the part of the primary resin producers towards participation in processing and fabricating operations and, as will be noted in the reports on specific products, these integrated large-scale firms have become an increasingly important factor in the marketing of certain plastic products in Canada.

In recent years, consumption of primary plastics in Canada has paralleled the spectacular growth in other industrialized countries.

(1) Canadian Plastics, February 1964, p. 38

(2) D.B.S., Cat. Nos. 46-211 and 47-208

Estimates of domestic growth indicate an average rate of increase of 12 per cent per annum since 1952. Total commercial consumption of resins in 1964 was reported to about 536 million pounds, 13 per cent higher than the 474 million of the previous year.⁽¹⁾ At a very approximate average value of 20 cents per pound, these resins, in primary forms, would have a commercial value of more than \$100 million. The growth in commercial consumption took place principally among thermoplastic resins; the market for thermosets showed a relatively small gain. Consumption of thermoplastic materials, in 1964, was reported as 389 million pounds, an increase of about 14 per cent over the previous year, whereas commercial consumption of the thermosets was 130 million pounds, only some 5 per cent higher than in 1963. Resins not separately identified amounted to 17 million pounds in 1964. These figures do not include all of the captive production of resins, among the more important of which are the very substantial quantities of nylon, terylene and other resins used directly in textile fibres and the alkyd resins produced by paint companies.

Individually, polyethylene has been the outstanding performer; its growth has averaged over 25 per cent a year since 1958.⁽²⁾ Total commercial consumption of the resin in 1964 was over 160 million pounds, the largest share being used to make film and sheet for packaging and covering and the rest being used in a variety of applications, including moulded products such as housewares and toys; coating for wire, cable and paper, and extrusions of pipe. Polyvinyl chloride's (PVC) rate of growth has also been impressive, averaging nearly 20 per cent per annum in recent years and some trade estimates, moreover, anticipate that the rate of growth of PVC will come to surpass that of polyethylene. While available estimates vary, it would appear that consumption of PVC in 1964 was not far from 100 million pounds, the bulk of which was used for flooring, protective coatings and film. Polystyrene, the third of the large volume thermoplasts, continues to grow at a steady pace; consumption, estimated at close to 50 million pounds in 1964, was mainly in the form of moulded products, including housewares, toys, and expandable foam. The celluloseics, mostly regenerated cellulose, are consumed in Canada at a rate of more than 50 million pounds a year. Having a longer commercial history, their growth rate now is less spectacular than that of the newer polymers.

Of the newer thermoplastic resins, ABS (acrylonitrile-butadiene-styrene) and polypropylene have found a rapidly increasing consumer acceptance since 1960. ABS consumption of about 7 million pounds in 1964 represented an increase of some 40 per cent over the previous year as the product proved suited to an increasing range of applications including pipe, electrical appliances, automobile interior components and luggage. Consumption of polypropylene was estimated to have been more than 8 million pounds in 1964, fifty per cent higher than in the previous year. Its uses are generally similar to those of polyethylene. There were also major gains recorded by the engineering plastics - nylon (in its non-textile uses), polycarbonates and the acetals - although the total amounts of these relatively expensive resins were not very large. In addition, the textile fibres and filaments have experienced very substantial increases in use in recent years.

(1) Canadian Plastics, February 1965, p. 24

(2) Transcript, Vol. 146, p. 21754

Among the thermosetting plastics, the most important in terms of consumption are the phenolic resins; more than half of the estimated 60 million pounds of this plastic used in 1964 took the form of adhesives for Canada's plywood industry. The alkyds also are significant in this group and of the 30 million or so pounds purchased in 1964, by far the greatest share was used by the paint industry. In addition, at least as much again is produced by paint companies for their own use. The total use of others, including principally urea-formaldehyde, the melamines, epoxies and polyesters, amounted in 1964 to more than 40 million pounds.

A number of plastics of less general and widespread use also are dealt with in this part of the report. These include hardened proteins (heading 39.04), modified natural resins (heading 39.05) and other high polymers (heading 39.06). Very few of these products are made in Canada and imports, for the most part, are still relatively small. However, some are products of specialized uses and their growing popularity points up the increasing variety of plastics that are coming into service.

In addition, certain plastics products are the subject of this part of the report, but the heterogeneous nature of this group of articles does not lend itself to ready summary; they are dealt with below under heading 39.07.

This growing demand for primary resins is relying to an increasing extent upon domestic production and there has been a steady expansion of productive capacity and resin output. All four producers of polyethylene have recently completed, or are in the process of making, major additions to capacity. The firms producing polyvinyl chloride resins have also embarked upon large expansion programs; to augment this production, a new entry, Imperial Oil Limited, is building a plant which is expected to make the company the second largest PVC producer in Canada. By 1966, capacity is expected to be more than double what it was in 1964. Programs of expansion are also in progress with respect to a number of other synthetic resins including polystyrene and ABS and plans are reported for the production of some of the newer and still relatively small volume plastics.

This rapid rate of response by Canadian resin manufacturers to the challenge of burgeoning domestic demand has meant that imports, although still substantial and increasing, are not so important a factor in supplying Canadian requirements as they once were. Apart from their competitive effect, imports supply the large quantities of specific grades of plastics which, for one reason or another, are not yet produced domestically. Imports also supply off-grade and scrap material and, in some cases, fill the requirements of certain subsidiary firms for formulations developed or specified by their parent companies. Even though the role of imports is in part complementary to Canadian production, it should be noted that the producers of primary resins in Canada continually emphasized the very strong competitive threat that low-priced supplies of the principal resins from other countries posed to their market in Canada.

While there is considerable difficulty in arriving at a meaningful total for imports because of the great variety of forms in which the resins are imported, it would appear that about 220 million pounds of resins in primary forms were imported in 1964. These had a value of approximately \$60 million. On this basis, imports are supplying approximately forty per cent of the commercial requirements of the basic forms (excluding production for captive use). In addition, about 40 million pounds of film and sheet and other processed forms (excluding final products) were recorded as imported in 1964, with a value of \$33 million. The total value of imports of the primary and processed forms, therefore, approached \$100 million in 1964.

A brief summary of known imports of resins, films, sheets and tiles is given in the following table, assigned, as far as possible, to the appropriate B.T.N. headings as listed above. Greater detail concerning these imports is given in the Statistical Appendix.

Summary of Imports of Synthetic Resins and Plastics Materials,
of B.T.N. Chapter 39, 1963 and 1964

		1963		1964	
		'000 lb.	\$'000	'000 lb.	\$'000
39.01	Resins and compounds	37,972	12,011	41,600	12,347
39.02	Resins and compounds	105,116	28,231	121,753	32,030
	Film and sheet	21,706	13,504	23,284	14,611
	Floor and wall tiles ^(a)	4,714	739	3,440	342
39.03	Cellulose plastics compounds	13,785	5,448	14,433	5,727
	Cellulose film and sheet	5,091	5,258	5,850	5,778
39.05	Resins from natural resins	11,940	2,809	12,858	2,899
Unallocated resins and plastics materials		<u>34,124</u>	<u>18,529</u>	<u>44,688</u>	<u>23,012</u>
Total of above ^(b)		<u><u>229,734</u></u>	<u><u>86,529</u></u>	<u><u>264,466</u></u>	<u><u>96,746</u></u>

(a) Quantity in square feet

(b) Quantity totals do not include floor and wall tiles

Source: D.B.S. Trade of Canada, Imports

Exports of plastics, mostly in primary forms, exceeded 150 million pounds in 1964 valued at close to \$40 million, a considerable increase from 1962 when they amounted to just over 100 million pounds

valued at about \$27 million. The bulk of these exports consisted of polyethylene, polystyrene and cellulose acetate; Hong Kong and the U.S.A. were the major markets.

The price of resins in Canada has generally reflected the steady decline in world prices which has accompanied the rapid development of volume production in the industry. Among the major plastics, average domestic selling prices for general purpose polyethylene declined from about 35¢ per pound in 1959 to 26.5¢ in 1965; general purpose PVC resin fell from about 22 cents per pound to 16 cents during the same period, while polystyrene resin, at 25 cents per pound in 1959, had fallen to 17¢ by 1965.⁽¹⁾ The general trend of prices in the industry is illustrated by a price index representative of all resins:

1956	100.0
1960	93.0
1961	89.8
1962	88.2
1963	86.4
1964	84.1
1965	82.8

Source: Canadian Plastics, February 1966, p. 34

With reference to price declines, the following comment is worth noting:

"Low-density polyethylene, polyvinyl chloride and polystyrene are three products for which price erosion led to significant increases in demand."⁽²⁾

This brief review of the broader aspects of the Canadian plastics industry suggests that it, like its counterparts in other industrialized countries, is participating in a spectacular era of expansion and development. Consumption figures reflect the impact of these new products on the material life of the nation, and production data indicate that domestic resources are being employed to an increasing degree to meet the demands arising out of this situation. Generally speaking, there do not appear to be major difficulties in the way of the industry's continued development along its present lines.

These observations should not, however, be taken to imply that there are no difficulties of any kind in the way of such development or that there are not certain areas within the industry which may be facing difficulties at the present time. These difficulties do exist and in the following comments concerning some problems of the domestic industry, as well as in the later product-by-product survey, these particular aspects of plastics production in Canada will be examined in some detail.

(1) Canadian Chemical Processing, April 15, 1965

(2) Chemical and Engineering News, August 3, 1964 p. 67

Problems of the Plastics Industry in Canada

This review of the plastics industry is the second one which has been made by the Tariff Board since the end of World War II. In 1949 the Minister of Finance, in response to "repeated representations" from firms engaged in the manufacture of synthetic resins in Canada, referred the tariff items related to these products to the Tariff Board for inquiry and report. The Board in making its report to the Minister in April 1952, stated that "Consideration of rates of duty on primary synthetic resins must take into account the following points:

"(1) Primary resins are close to the base of the cost structure of both plastic products and many other goods such as paints, glues and plywoods, and the degree of protection on many of the end-products must be regarded as fixed from the Board's point of view;

"(2) In current conditions of tight supply brought about by defence demands both in Canada and other countries, producers of primary resins are not seriously suffering from foreign competition. There is fairly conclusive evidence that they can at the moment dispose of all they can produce;

"(3) Little evidence has been adduced indicating that substantial hardship has been suffered by primary producers at any time during the past three or four years. The desire for a measure of protection is generally related to the anticipation of a return to so-called 'normal times';

"(4) Manufacturers of resins contend that in most cases costs of manufacturing primary resins are higher in Canada than in the principal supplier countries.

"The Board is of the opinion that a modest tariff is justified on certain types of resin made in Canada. It is felt that such modest tariff will provide a cushion, available in the event of any sudden change in the overall economic situation, without too greatly inflating the cost structure of the users of these materials."(1)

These general observations, made more than a decade ago, are by no means irrelevant to the situation in which the plastics industry finds itself today. This study, like the earlier one, has found little evidence of hardship being experienced by producers of primary resins in Canada -- in fact, as is apparent from the discussion under the previous heading, the industry gives every indication of being in a remarkably healthy state. At the same time, however, considerable time and effort were expended by the producers, in the course of Reference 120, to demonstrate a need for increased protection. Essentially, the arguments in support of this position are based on the view that world overcapacity in the production of primary resins constitutes a serious threat to the Canadian industry, particularly since Canadian costs of production were represented as higher than those of other major plastics producers, and that the domestic market should be

(1) Report of the Tariff Board, Reference 109, p. 36

rendered less vulnerable to this threat by raising the tariff level on these products. This view was, of course, generally opposed by the users of resins on the grounds that the impressive rate of growth of the primary industry in recent years was evidence enough of its ability to cope with import competition under the existing level of tariffs and that any increase in duties could lead to increased resin prices and so weaken the position of the secondary producers.

The problem of overcapacity has already been touched upon above. It would appear that, while a rather strong tendency towards overcapacity and surplus production may be inherent in the industry, there is no evidence of the kind of slackening in the growth of demand which would permit such a tendency to become a significant threat to Canadian producers. The problem, moreover, is one that constitutes a potential threat to all resin producers and not just those in Canada. Whether the Canadian market may be more vulnerable to the impact of excess world supplies than other countries' markets, as maintained by many of the manufacturers before the Board, is a question that does not lend itself to facile answers. Eventually the question narrows down essentially to the matter of comparative costs of production and the basic factors determining these costs, an issue much discussed but not resolved during the course of the Board's hearings.

The usual position of producers in the plastics industry on the question of costs is indicated by the following quotation from the Board's Report of 1952 on Reference 109:

"Those making representations before the Board, no matter what level of this industry they represented, were unanimous in driving home again and again their belief that the basic reason for higher costs was the small size of the domestic market, the lack of export markets, and therefore the limited volume of Canadian production as compared with that in other large-producing countries."(1)

The validity of this position in the context of the plastics industry in Canada today is far less evident. As will become apparent in more detail in the following product reports, the Canadian market for synthetic resins and plastics has developed in spectacular fashion in the past decade. The available domestic market often is served by more than one producer, suggesting a willingness to forego some of the economies of scale. The export of these products, moreover, has become increasingly significant. Production on a scale consistent with optimum size plants becomes increasingly attainable for domestic manufacturers.

An awareness of the changing circumstances affecting the Canadian competitive position in the synthetic resins field was demonstrated on occasion by parties appearing before the Board. The following statement by a Canadian producer of plastic film for packaging is illustrative:

(1) Reference 109, p. 34

"In our experience, the size of the Canadian market does not necessarily mean that the Canadian manufacturer cannot produce at as low a cost as manufacturers in the United States. It may merely mean that there will be fewer manufacturing plants producing the product or that it may not be practical to manufacture certain products in Canada at all."(1)

The traditional approach, however, was more typical. The primary resin producers tended to share the view that they should have sufficient protection to be assured of the entire domestic market for their products, a situation which, they represented, would permit them to expand production, lower unit costs and thereby increase income without any "undue" increase in prices. It was also contended that Canadian producers could, with respect to all the important plastic materials, meet virtually any demand on the part of domestic users for specialty and technical type resins at present being served by imports.

Broadly speaking, therefore, there seems to have now developed in this country a market large enough to permit efficient production and economies of scale in the manufacture of the major types of resins. Where a large domestic demand does exist, any higher costs of production which result from limited volume may well be more closely related, to an appreciable extent, to other factors, such as the proliferation of production units, rather than to the size of the market itself.

For certain specialty resins there are relatively limited requirements by Canadian users. Reasonable access to foreign supplies seems essential for these and for new products developed abroad. It is probable that a fairly substantial share of imported resins are in these special categories.

On the question of comparative costs of resin production in Canada with those in other countries there was, in addition to the familiar one on the size of the market discussed above, another point raised which deserves special mention. This concerns the higher level of duty that applies to some of the raw materials used in making the resins than to the resins themselves. Most of these materials are the subject of other parts of this study (for example, the monomers of B.T.N. Chapter 29), and the Board, therefore, is in a position in this Reference to deal with the problem on an integrated basis. For the most part, the producers of primary plastics did not oppose the rates of duty on the materials, in large part because many of the producers of primary plastics are also among the largest producers of other chemicals. In part, this absence of opposition reflected the general approach of the chemical industry to uniform rates of duty on the basic chemicals and a proposal for the same or higher rates on plastics and plastics products.

Another problem of particular concern to the domestic plastics industry is the importation of off-grade and scrap material. The problem has its origin in the fact that the plastics have not got distinctive grades or characteristics which fit them uniquely for one or

(1) Transcript, Vol. 136, p. 20240

another use. A resin may contain specifications designed for a particular use in injection moulding, blow moulding, film, wire covering and so on but if, for some reason, it does not meet the specifications, it is off-grade for that use, even though well suited for some, more general purpose. Such an "off-grade" resin may be sold at a discount of from 25 to 75 per cent and still be a prime resin for the other use. This naturally can have a disturbing effect on the market whenever a large supply of off-grade resin becomes available. These off-grade materials may be exported to prevent disturbing the domestic price structure. It appears that the situation is open to abuse in that any surplus resin may be declared to be off-grade and priced accordingly for export.

Section 38 of the Customs Act, dealing with valuation provides, it was said, little relief from imports of this kind and, as a means of coping with the problem, it was recommended to the Board that a 5¢ per lb. minimum specific duty be applied to the products most vulnerable to this practice. Reference was made to the ruling by the Minister of National Revenue (Departmental Memorandum D46-12, September 22, 1961) whereby off-grade polyethylene and certain cellulose resins are declared to have a value of no more than 10 per cent below the prime grade and the view was expressed that, in principle, this ruling was an even more effective deterrent than the proposed specific minimum. In practice, however, it was represented as having certain drawbacks in that it is administrative rather than statutory and is, at present, confined to only two types of resin. The proposed specific minimum was intended to afford statutory protection and cover all relevant resins.

The position taken by the proponents is summarized in the following quotation:

"Our recommendation is intended to write into the tariff some portion of the protection afforded by the ruling and extending broadly across all plastics...we would be very happy to see this ruling become law...and be extended to all plastics. It comes very close to being...the complete answer...that is, you might say, an embargo on off grades."⁽¹⁾

Scrap material, unlike off-grade, is not covered by the present ruling but it would be affected, of course, by the proposed specific minimum duty. While not a problem of the same dimensions as off-grade, imports of scrap were said to create some difficulties for Canadian producers. As it was explained to the Board:

"There is this difference about scrap, that the amount of scrap available is not flexible in the sense that this substandard material (off-grade) is. Whether material is substandard or not depends in part upon the state of the market; whereas the amount of scrap is a...fact you cannot change."⁽²⁾

The Structure of the Customs Tariff

Reference should be made to the general structure of the Customs Tariff which applies to synthetic resins and plastic material.

(1) Transcript, Vol. 122, p. 18244

(2) Same, Vol. 123, p. 18351

The present Tariff, which is based on the recommendation made by the Tariff Board in Reference 109, is a "pattern" or "progressive" type of tariff with the lowest rates of duty on the products of the earliest stages of manufacture and increasing rates at subsequent levels through to the finished product. In coming to this conclusion in 1952 the Board had been impressed with the apparent difficulties which Canadian plastic manufacturers, with their relatively smaller scale of production, experienced in meeting certain foreign competition and the Board took the view that "the problems of short runs and limited volume probably grow more acute at each advancing stage of manufacture." The argument, in brief, was that the possibilities of producing a uniform product, for which alternative uses are available, generally diminish as one moves toward the finished, or end, product and so, therefore, do the possibilities of approaching optimum size operations which could withstand international competition from large scale producers. Having decided on this "progressive tariff" approach, the Board was faced with the fact that most of the end products were already bound against increase at rates averaging something over 20 p.c. and, therefore, it had to recommend what it considered to be the best distribution of the quantum of protection among the various stages of manufacture. Since there were several stages of manufacture involved, it meant that the earliest stage, the primary resin, had to be duty-free, or very close to it.

The Tariff schedule recommended by the Board in 1952 consisted of eight items dealing with synthetic resins in various forms (901 to 908), a corresponding seven items covering cellulose plastics (909 to 915), two items covering laminated and reinforced plastics (916 and 917), an item for regenerated cellulose (918), two covering protein plastics (919 and 920) and, finally, three end-use items providing for materials (921, 922 and 923).

Within the synthetic resin group, the items were divided into four classes, corresponding roughly with the successive stages of plastics. The first item with its subdivisions covered basic resins (901). The next three items dealt with synthetic resin compositions for moulding and other purposes (902, 903, 904). The next three items (905, 906, 907) covered sheets and other primary moulded forms, which are the raw material of the fabricator, as well as foamed and expanded resins. Finally, an item (908) was included for manufactured goods not elsewhere provided for. The same general pattern was followed for cellulose plastics. Various sub-divisions were made in some of the items for different types of resins.

The present study of the plastics industry has, at the suggestion of the chemical and plastics industry, been approached along the lines of classification set out in the Brussels Tariff Nomenclature in which plastics are divided principally on a chemical basis rather than, as in the Canadian Tariff, on the basis of stages of manufacture. All forms of any particular product up to, but not usually including, finished articles, are classified under the same heading. Scope for divisions based on stages of manufacture, of course, may be added in the form of subheadings, just as in the Canadian Tariff there are sub-divisions providing specifically for different resins.

During the hearings on resins and plastics a number of submissions recommended that the progressive type tariff should be retained, while others argued that it was largely unnecessary provided that uniform rates applied at all stages.

Tariff Proposals

While most of the representations received by the Board related to specific products or forms of products, a number of parties made recommendations relating more generally to plastics or to headings of the B.T.N. These general recommendations are outlined in the following paragraphs.

As a system of tariff classification for "artificial resins and plastic materials, cellulose esters and ethers, articles thereof", the Industry Committee proposed the adoption of the seven headings of Chapter 39 of the Brussels Tariff Nomenclature. In addition, the Committee incorporated into its tariff structure proposals made by other parties for rates for specific products. It also proposed rates of 15 p.c., B.P. and 20 p.c., M.F.N., for five of the headings, for any goods classified under the headings for which the Board should receive no other proposal. The Committee also stated that the rates shown in its compilation for the other two headings, 39.02 and 39.07, were being reported for other parties who had proposed rates for all products of these headings.⁽¹⁾

Two systems were proposed by the Committee to deal with problems arising from the fact that Chapter 39 covers certain products now classified under items not within the Board's terms of Reference. It suggested incorporation into the Tariff of certain chapter notes, specifying that none of the headings applied to synthetic rubber or to any goods more specifically described elsewhere in the Customs Tariff. For certain other products, such as vulcanized fibre, which is now classified under an item outside the scope of Reference 120, it suggested that the tariff provisions be relocated, at the existing rates of duties, under the appropriate B.T.N. headings.

Dow Chemical of Canada Limited, in its general brief on plastics stated that:

"It is our strong recommendation that no exceptions from the Brussels heading rates be allowed for plastic materials. For Brussels heading 39.02 we recommend rates of 15 p.c., B.P. and 20 p.c., M.F.N., with a minimum of 5¢ per pound. Our knowledge of the need for a minimum duty of 5¢ per pound does not extend beyond the products in heading 39.02. However, since products in the other headings of Chapter 39 compete with those in heading 39.02 we reckon that the duty rates of the other headings in Chapter 39 should be no less than 15 p.c., B.P. and 20 p.c., M.F.N."⁽²⁾

The company spokesman indicated that there would be no objection to a tariff structure taking into account non-competitive products but that as all plastics are to a greater or lesser degree competitive, Dow Chemical had found itself unable to devise such a structure for plastics. Rates of 15 p.c., B.P. and 20 p.c., M.F.N. were proposed in the company's general submission because uniform rates were regarded as appropriate to all products of one industrial complex. The reasons for the five-cent minimum are discussed elsewhere in the introduction to this part of the report.

(1) Transcript, Vol. 121, p. 18072-6

(2) Same, Vol. 122, p. 18223

A spokesman for Du Pont of Canada Limited, in the course of the discussion of the company's submission on polyethylene resin, indicated that, although polyethylene was the only material under heading 39.02 on which Du Pont had sufficiently detailed knowledge to support a rate recommendation, the company felt "that the essential competitive nature of all the items which are grouped together under 39.02 make it imperative that we do have a Heading rate for this item and our recommendation is that the Heading rate should be 25 per cent British Preference, 25 per cent Most-Favoured-Nation, and five cents per pound minimum specific." (1)

Canadian Industries Limited also based its proposals for heading rates on the justification of particular rates of duties on the products manufactured by the company. It proposed that the same rates should apply to all products because of the general competitive nature of the products under a heading. The company did not oppose any proposals by other parties for lower rates on products not competing with those made by C.I.L. Subject to such exceptions, the company proposed M.F.N. rates of 20 p.c. for headings 39.01 and 39.03, 25 p.c. but not less than 5 cents per pound for 39.02 and 30 p.c. for 39.07. (2) With respect to British preferential rates, the company stated that it was making no recommendations, but would not object to 15 p.c. under headings 39.01 and 39.03. This statement was subsequently amplified by a spokesman for the company who pointed out that there are currently almost no British preferential margins in the synthetic resin Schedule, that under GATT there is an obligation not to increase preferential margins and that, as any departure from this commitment would be a matter of major government policy, the company would not recommend it. (3)

In its brief on aminoplasts under heading 39.01, Cyanamid of Canada Limited, basing its rate proposal on what it felt it required for its own products, proposed that rates of 15 p.c., B.P. and 20 p.c., M.F.N., should apply to all products of 39.01 (4) because all are, to a certain extent, competitive. In so far as the company's own products were concerned, this was said to be particularly true of phenolic and alkyd resins.

Schenectady Chemicals Canada Limited urged the adoption of the Brussels Tariff Nomenclature and uniform rates of 15 p.c., B.P. and 20 p.c., M.F.N., for all products of headings 39.01, 39.02 and 39.05, except when products are not made in Canada. The company further suggested that goods should be held to be made in Canada if identical products are made here or if "products satisfactory for substitution over a substantial area of consumption of imports are made in Canada" and available at comparable prices. More specifically, it proposed that there should be no exceptions to heading 39.01 at lower rates and that all products of this heading should be ruled made in Canada. This firm also advocated "the elimination of special privileges to certain industries, including our own, by avoiding classification by 'end use'." (5)

(1) Transcript, Vol. 140, p. 20922

(2) Same, Vol. 132, p. 19736-9

(3) Same, Vol. 137, p. 20504

(4) Same, Vol. 126, p. 18794

(5) Same, Vol. 127, p. 18930-3, 18948

Minnesota Mining & Manufacturing of Canada Limited, in a general brief concerning products consumed and those produced by the company, advocated rates of 15 p.c., B.P., and 20 p.c., M.F.N., and 30 p.c., General for headings 39.01, 39.02, 39.03, 39.05 and 39.07. Under the first three headings, the proposal also called for free entry for all resins not made in Canada, until such time as made here, when the heading rates would apply. The company also listed specifically the exceptions of interest to it. Under the last two headings, there was suggested in each case one specific exception on the same basis. In putting forward the proposed heading rates, the firm stated that it advocated a fair rate of protection, equal to the prevailing rates, on the Canadian-made materials it purchased and on the items it manufactured. Free entry for not-made-in-Canada materials of significant importance to the Canadian economy was requested primarily to stimulate the market growth to the point where Canadian manufacture would be economical. Free entry for all not-made-in-Canada resins would permit wide access to newly developed products from other countries without a specific request for an exception to a heading.⁽¹⁾

The Cryovac Division of W.R. Grace & Co. of Canada Ltd. advanced certain general propositions concerning appropriate rates on resins and films. These were that:

(1) there should be free entry or a nominal rate of duty for a fixed period following initial importation of items not manufactured in Canada to enable development of a market giving incentive to Canadian industry to manufacture such items;

(2) tariffs on plastic films should be no higher than those on the corresponding resins as this would provide adequate protection for efficient Canadian production;

(3) resin tariffs of more than 20 p.c. would make competition abroad difficult and be equivalent to public subsidization of the Canadian resin industry. A spokesman for the company suggested that if the tariff level were about 10 p.c. exceptions to the heading rates would not be necessary, but there would still be some discouragement of the importation of like materials. In respect to some of the proposed rates for plastics, the company drew attention to the questions of competition with integrated manufacturers and the need of access to new raw materials. In support of the proposition that rates on films should be no higher than on resins, it was stated that the company had found manufacturing costs in Canada to be higher than in the U.S.A. only in respect to specialized supplies, materials and equipment on which high duty rates made the landed cost higher whether manufactured in Canada or imported from the U.S.A.⁽²⁾

Turning more specifically to headings 39.01 and 39.02, the company, while accepting the B.T.N. as a basis for dealing with tariff problems, suggested a number of possible courses of action:

(1) that there be no change in the existing rates;

(2) that if higher rates should be recommended for resins, then film and sheet should be dutiable at the same rates as resins;

(1) Transcript, Vol. 162, p. 24086-92

(2) Same, Vol. 136, p. 20237, 20239, 20276-7

(3) that there should be either a time-limited duty-free quota on resins and films not made in Canada or a rate such as 5 p.c. on "not-made" materials to discourage "pure and simple bargain hunting";

(4) that consideration be given with respect to the chemicals industry to a "bridge" arrangement with the United States similar to that recommended for the automobile industry in the Bladen Report.

Archer Daniels Midland Company (Canada) Limited recorded its support for the rate proposals shown in the Industry Committee's compilation. The company specifically expressed the view that duties on finished resin products should be equal to or greater than the duties on raw materials. The rates supported by the company are required because the smaller size of plants in Canada leads to higher costs; Canadian producers must supply a full line of products to serve the market and thus leave themselves exposed to selective raids by U.S. exporters in the large volume items. The Canadian producers located mainly in the east must serve markets across the country in competition with more geographically wide-spread U.S. production.

Paisley Products of Canada Limited opposed the rates reported by the Industry Committee and suggested, with certain exceptions, rates of 5 p.c., B.P. and 10 p.c., M.F.N., for heading rates for 39.01; 10 p.c., B.P. and 10 p.c., M.F.N., with minimum rates of 2 cents per pound under both Tariffs for heading 39.02 and 15 p.c. under both Tariffs for heading 39.07, with products of this last heading of a class or kind not made in Canada to be dutiable at 7½ p.c. under both Tariffs. These proposals, it was suggested, would maintain the status quo and prevent the undesirable results of higher rates. (2)

The views of the Moulders and Extruders Division of the Society of the Plastics Industry, which advocated free entry for resins and compounds and under those circumstances, rates of 30 p.c., B.P. and 40 p.c., M.F.N. for manufactured products, are discussed in the section of this report dealing with heading 39.07. (3)

Scepter Manufacturing Company Limited indicated that it used various resins such as polyvinyl chloride, polyethylene and acrylonitrile-butadiene-styrene. The company proposed no rates for these but stated that it would prefer no change in existing rates on raw materials. If rates on resins and compounds were increased, it felt that rates on products should also be increased to maintain at least the existing relative protection on its manufactured products. (4)

Duplate Canada Limited and its associated company Smith and Stone Limited requested that, until the types they require are produced in Canada, there be no change in the free entry provided under tariff item 902(f) for "other type" moulding compounds. (5)

Carlew Chemicals Limited suggested that no changes in the current rates or classification be made at present, but its views

(1) Transcript, Vol. 123, p. 18486

(2) Same, Vol. 123, p. 18488

(3) Same, Vol. 124, p. 18512

(4) Same, Vol. 157, p. 23331

(5) Same, Vol. 159, p. 23702

were based on satisfactory operation under the existing situation including duties, exchange rates and surcharges. The company suggested that, if the surcharge were incorporated with the existing rate but the dollar were taken at par, there might be long range justification for an increase of about one cent per pound in the rate on polyvinyl chloride, but that changes in duties and classification should be made in the context of over-all planning of Canadian industry.⁽¹⁾

Two organizations of overseas suppliers also placed views on record. A proposal was made on behalf of the Japan Plastics Industry Association that there be no increases in the existing rates of duties on resins and plastics. No brief was presented and no one appeared before the Board in support of the proposal.⁽²⁾ The British Plastics Federation pointed out that no country is in a position to produce all grades of all materials and that high protection can cut off access to raw materials and slow the growth of an industry. The Federation added that almost all Canadian plastics enter Britain duty-free under the Preferential Tariff and that British imports, in quantity and value, of plastics from Canada exceeded exports of British plastics to Canada some 3 to 4 times. The Federation asked for reciprocation, where possible, of British preferential treatment, that there be no duties where none now exist, and, as a proposal going beyond the scope of the Reference, that free goods should be exempt from dumping duty.⁽³⁾

A number of Associations of consumers also expressed views bearing in general on plastics. The Rubber Association of Canada, whose members are producers and consumers of a wide range of synthetic resins and plastics and products made therefrom, recorded its opposition to any changes that would have the effect of raising duty rates on resins and plastics above those applicable under the existing Customs Tariff.⁽⁴⁾ The Association claimed that the plastics industry had expanded and flourished under the existing Tariff and that rates needed to be low to enable Canadian manufacturers of plastics and plastics products to keep up with technological changes and new materials, largely developed in the U.S.A. It claimed that the proposed increases would inflict crippling increases in costs of plastics materials on members of the rubber industry engaged in the production of plastics products and inhibit further expansion in this field. The resulting increases in the prices of plastics products would be to the immediate detriment of the Canadian public and ultimately to that of the plastics industry itself.

The Canadian Pharmaceutical Manufacturers Association listed a few products of Chapter 39, particularly under headings 39.02, 39.03 and 39.06, as being used by its members. It suggested generally that chemicals for use in the manufacture of pharmaceutical products should be free of duty under the B.P. Tariff and dutiable at 15 p.c., M.F.N., when not made in Canada and dutiable at the heading rates when produced in Canada.⁽⁵⁾

(1) Transcript, Vol. 122, p. 18295, 18297, 18308

(2) Same, Vol. 123, p. 18466

(3) Same, Vol. 123, p. 18472f

(4) Same, Vol. 123, p. 18394-5

(5) Same, Vol. 87, p. 13278

The Canadian Pulp and Paper Association, in a general submission to the Board, also listed a number of products of Chapter 39 of interest to its members, and registered its opposition to any changes in the Tariff that would have the effect of increasing the costs of the pulp and paper industry.⁽¹⁾

Both the Canadian Federation of Agriculture⁽²⁾ and the National Farmers Union⁽³⁾ made general submissions to the Board opposing increases in tariffs on products of the chemical industry of interest to farmers. Both included some mention of plastics in the course of their submissions.⁽⁴⁾

This part of the report is divided according to B.T.N. headings as follows:

- 39.01 Condensation, polycondensation and polyaddition products, whether or not modified or polymerised, and whether or not linear (for example, phenoplasts, aminoplasts, alkyds, polyallyl esters and other unsaturated polyesters, silicones).
- 39.02 Polymerisation and copolymerisation products (for example, polyethylene, polytetrahaloethylenes, polyisobutylene, polystyrene, polyvinyl chloride, polyvinyl acetate, polyvinyl chloroacetate and other polyvinyl derivatives, polyacrylic and polymethacrylic derivatives, coumarone-indene resins).
- 39.03 Regenerated cellulose: cellulose nitrate, cellulose acetate and other cellulose esters, cellulose ethers and other chemical derivatives of cellulose, plasticised or not (for example, collodions, celluloid); vulcanised fibre.
- 39.04 Hardened proteins (for example, hardened casein and hardened gelatin).
- 39.05 Natural resins modified by fusion (run gums); artificial resins obtained by esterification of natural resins or of resinic acids (ester gums); chemical derivatives of natural rubber (for example, chlorinated rubber, rubber hydrochloride, oxidised rubber, cyclised rubber).
- 39.06 Other high polymers, artificial resins and artificial plastic materials, including alginic acid, its salts and esters; linoxyn.
- 39.07 Articles of materials of the kinds described in headings Nos. 39.01 to 39.06.

(1) Transcript, Vol. 36, p. 5246

(2) Same, Vol. 110, p. 16618

(3) Same, Vol. 82, p. 12511

(4) Same, Vol. 107, p. 16224; Vol. 110, p. 16631

CONDENSATION, POLYCONDENSATION AND POLYADDITION PRODUCTS, WHETHER OR NOT MODIFIED OR POLYMERISED, AND WHETHER OR NOT LINEAR (FOR EXAMPLE, PHENOPLASTS, AMINOPLASTS, ALKYDS, POLYALLYL ESTERS AND OTHER UNSATURATED POLYESTERS, SILICONES) - B.T.N. 39.01

INTRODUCTION

This heading covers those synthetic resins produced by the processes described in its wording. Condensation and polycondensation products are those formed by reaction between several molecules of the same or of different chemical constitution with the elimination of simple substances such as water; in these products the structural units are normally linked together by functional groups. The heading also covers products, including polyaddition products, in which the structural units are linked together by functional groups, obtained from substances which do not require the elimination of water or other simple substances.

Several of the principal types of products are given as examples in the wording of the heading. In the Explanatory Notes to the Brussels Nomenclature, the products of 39.01 are discussed under the following sub-headings:

- (A) Phenoplasts, resinous products derived from the condensation of phenol or its homologues, or substituted phenols, with aldehydes.
- (B) Aminoplasts, formed by the condensation of amines or amides with aldehydes.
- (C) Alkyd resins, polycondensation products of polyhydric alcohols with polybasic organic acids.
- (D) Unsaturated polyesters, prepared by the condensation of polyacids with saturated or unsaturated polyalcohols, containing at least one unsaturated compound, including allyl resins.
- (E) Certain other polycondensation and polyaddition products, e.g.:
 - (1) polyamides and superpolyamides, including nylons
 - (2) linear polyesters
 - (3) polycarbonates
 - (4) polyethers
 - (5) polyethylene imines
 - (6) polyurethanes
- (F) Epoxy resins
- (G) Silicones

Most of the products of this heading are thermosetting, but a few, such as the polyamides, polycarbonates and some polyurethanes, are thermoplastic resins. The more important forms are dealt with in separate sections of the report in the order noted above as that in

the Explanatory Notes of the B.T.N. Some products of lesser commercial importance in Canada are covered in the concluding section headed "Other Resins of 39.01."

Canadian production of polyamides and of linear polyesters is largely directed towards captive use in the production of synthetic textiles. A substantial part of the alkyd resins also are produced for captive use by the paint companies which make them, and significant amounts of the phenoplasts and aminoplasts are used captively by the companies producing them. In the following table production for captive use is excluded; the data, therefore, do not fully reflect Canadian use. Total production is estimated to have been, in 1964, approximately twice that shown below as commercial production.

Products of 39.01

	<u>Commercial Production</u>	<u>Imports</u>	<u>Exports</u>	<u>Commercial Consumption</u>
		- thousand pounds(a) -		
1962	92,510	28,880	500	120,890
1963	94,970	30,475	1,240	124,205
1964	102,400	30,225	1,450	131,175

(a) Net resin, dry basis except for surface coatings

Source: Canadian Plastics, February 1964, February 1965

The above data relate to a wide variety of resins in varying forms, but they would suggest an annual market of between \$30 and \$40 million. Imports exceed exports by a substantial margin, although occasionally advantage can be taken of particular export opportunities that reduce the net import balance. Not an inconsiderable portion of the imports represents purchases by Canadian resin producers either for their own use or for re-sale.

About 45 per cent of the total of the above consumption in 1964 was accounted for by the phenolic resins, with the aminoplasts and the alkyds each amounting to more than 20 per cent. However, if account were taken of captive production, the very substantial quantities of resins such as polyamides (nylon) and polyethylene terphthalate (for example, for terylene) which enter directly into the manufacture of textile filaments would result in the polyamide and linear polyester groups ranking high in output; these are not reflected in the above data.

Apart from the polyamide resins, the Canadian producers generally favoured rates of 15 p.c., B.P. and 20 p.c., M.F.N., for all products of heading 39.01, although some were prepared to allow exceptions for products not produced in Canada. On the other hand, Canadian consumers and producers abroad generally sought maintenance of the status quo or reductions in duty. The arguments presented on each side are discussed in the general introduction and in the sections on specific resins. These sections also deal with problems of tariff

classification including some which arise because of goods covered by heading 39.01 but at present admitted under tariff items not within the Board's terms of reference.

Since the public hearing, very significant changes have occurred with respect to polyamide resins of the nylon type. The then sole Canadian producer of nylon, Du Pont of Canada Limited, proposed rates of 25 p.c., B.P. and 30 p.c., M.F.N. for all polyamides. Recently, three other firms have entered the nylon field in Canada and opposition has been registered to the Du Pont proposals. These matters are discussed in more detail in the section of the report dealing with polyamides.

PHENOPLASTS

This group of plastics comprises a wide range of resins derived from the condensation of phenol, or substituted phenols like cresol, with aldehydes such as formaldehyde, acetaldehyde and furfural. Phenol-formaldehyde resins were the first synthetic plastics to be developed and since their successful formulation in 1909 have remained the most important of this group. Bakelite is the trade name perhaps best known of these resins. The phenolics are hard, rigid materials, usually dark brown in colour, with good chemical and heat resistance and excellent electrical insulating properties. They are the most popular of the thermosetting plastics and are widely used as moulding materials, particularly in the electrical industry, and also as bonding and adhesive agents in the production of laminates, thermal insulation and plywood. In Canada their largest single use is in the plywood industry; they are also employed in the manufacture of batteries, brake linings, electrical appliances, insulating varnishes, chemical resistant coatings and food container linings.

The major portion of the phenoplasts, at least 75 per cent, is said to be produced by the condensation of phenol with formaldehyde.⁽¹⁾ Certain of the other phenoplasts are dealt with below under the heading "Other Resins of Heading 39.01." In the presence of a basic catalyst, the condensation reaction goes through three more or less distinct stages. In the first stage, the resin is thermoplastic and completely soluble in alcohol; the second-stage resin softens but does not melt on heating and swells without dissolving in alcohol. The fully cured third-stage resin is thermosetting and completely insoluble in solvents. If an acid catalyst is used, the condensation reaction proceeds much more rapidly and yields a thermoplastic product known as a novolak. Novolaks and resins of the second stage can be cured to the thermosetting form by the addition of formaldehyde and an alkaline catalyst to give the thermosetting phenol-formaldehyde resins.⁽²⁾ The properties of these resins will vary depending on the starting materials and processing conditions used and they are also often modified by the incorporation of other materials including alcohols and rosins.

(1) Transcript, Vol. 125, p. 18733

(2) Condensed Chemical Dictionary, Reinhold Publishing Corp., New York, Fifth Edition, Third Printing, 1958

Phenol-formaldehyde resins are manufactured in Canada by the batch process in reaction vessels of different sizes ranging from a few hundred to a few thousand gallons capacity. After the condensation reaction, the process of manufacture is generally completed by cooling, or the material is further concentrated and cooled or converted to powder form with or without further compounding.⁽¹⁾ The compounds are made in a large variety of grades; the simplest form consists of phenolic resin and a filler such as very fine sawdust, but elaborate compounds are made to suit particular specifications.

Commercially, these resins are offered in a variety of amber shades and are available as fluids of varying viscosity, as solids in lump form or finely pulverized, as solutions or dispersions in water or organic solvents. They are shipped in bulk by tank car or tank truck, or in 45 gallon drums, and as powdered products in bags or fibre drums.

The Industry

The manufacture of phenoplasts in Canada was begun in 1923 at Toronto by Electrolax Ltd., a firm which in 1925 became the Bakelite Company and, later, the Bakelite Division of Union Carbide Canada Limited. Today ten companies manufacture phenolic resins in fourteen plants located in Quebec, Ontario, Alberta and British Columbia.

The original products of the Bakelite Company were phenol-formaldehyde resins, moulding compounds and other products based on these resins. During the early years, the market for these products was small; growth was slow and the company operated a custom moulding plant from about 1923 to 1929 to provide an outlet for its moulding materials. Beginning in 1939 defence requirements increased the demand for phenolic resins; after the war the market expanded rapidly in Eastern Canada and the company's operations were transferred in 1949 to a new plant at Belleville, Ontario. Bakelite manufactured its resins from imported phenol and formaldehyde until 1953 when a plant was completed at Belleville for the production of formaldehyde as part of a plan to establish a fully integrated operation in Canada. Phenol is now purchased from Canadian suppliers. The Division's facilities at Belleville are said to be "the most comprehensive and complete manufacturing unit in the phenolic resin field in Canada. The plant contains facilities for the production of all types of phenolic resins, a large moulding material unit rebuilt in 1961 and a complete laminating plant."⁽²⁾

Monsanto Canada Limited, a leading firm in the field of synthetic adhesives, manufactures phenolic and other resins at plants located in Montreal, Que., Edmonton, Alta., and Vancouver, B.C. The company does not produce moulding compounds and is mainly interested in the resins which are used as adhesives, for impregnation, in coatings and for other miscellaneous applications. The resins are manufactured in aqueous solutions from domestically supplied phenol and formaldehyde. The company's three plants are situated to serve the large-volume markets and all are designed to produce a wide range of products.

⁽¹⁾ Transcript, Vol. 125, p. 18676

⁽²⁾ Same, Vol. 125, p. 18733

Reichhold Chemicals (Canada) Limited started the manufacture of liquid phenol-formaldehyde resin at its Port Moody, British Columbia, plant in 1952 and, later, of both liquid and dry resins at St. Thérèse, Quebec. The principal product at Port Moody, B.C. is phenol-formaldehyde resin for the plywood industry; the dry resin made at St. Thérèse is mostly used in the manufacture of moulding compounds, in part for captive use by the company's compounding plant at Lindsay, Ontario. The two resin plants also produce formaldehyde.

Canadian Marietta Limited, now Pacific Resins, Limited, commenced the manufacture of resins at New Westminster, B.C. in 1948 and at Edmonton, Alberta in 1956. The phenolic resins made at these two plants are of aqueous solution type which are sold to plywood manufacturers in Western Canada.

The Borden Chemical Company (Canada) Limited has, since 1961, produced phenol-formaldehyde in aqueous solution at its plant in North Bay, Ontario and, in 1963, facilities were added to manufacture formaldehyde.

Three firms -- the Arborite Company, Cyanamid of Canada and Fiberglas Canada Limited -- are reported to produce phenol-formaldehyde resins for their own use in the manufacture of various building products.⁽¹⁾ Other manufacturers are: Canadian General Electric which has made phenolic resins in organic solvent since 1931 for the manufacture of insulating varnishes (wire enamels) and surface coatings, and Schenectady Varnish Canada Ltd., a manufacturer of modified phenolic resins since 1957 for use in the manufacture of surface coatings and printing ink vehicles. In all, there are ten manufacturers of phenol-formaldehyde resins in Canada, of which seven produce for sale. A list of these companies and their plant locations is given below:

Phenol-Formaldehyde Plants

<u>Company</u>	<u>Plant Location</u>
The Arborite Company, Division of Domtar Construction Materials Limited	LaSalle, Que.
The Borden Chemical Company (Canada) Limited	North Bay, Ont.
Canadian General Electric Company Limited	Toronto, Ont.
Cyanamid of Canada Limited Building Products	St.-Jean, Que.
Fiberglas Canada Limited	Sarnia, Ont.
Monsanto Canada Limited	Montreal, Que.
	Edmonton, Alta.
	Vancouver, B.C.
Pacific Resins Limited	Edmonton, Alta.
	New Westminster, B.C.
Reichhold Chemicals (Canada) Limited	St. Thérèse, Que.
	Port Moody, B.C.
Schenectady Varnish Canada Limited	Scarborough, Ont.
Union Carbide Canada Limited, Bakelite Division	Belleville, Ont.

Source: Transcript, Vol. 125, p. 18759; Vol. 126, p. 18864; Vol. 127, p. 18930; Vol. 129, p. 19361; Canadian Plastics, Feb. 1965, p. 30

⁽¹⁾ Canadian Plastics, Feb. 1965, p. 30

Raw materials were said to represent about 74 per cent of the selling price of the finished product and, with the exception of resorcinol, virtually all of them are available in Canada.⁽¹⁾

The differences in composition of phenolic resins make plant capacity difficult to determine with any degree of precision. A commercial installation of about 2,000 gallons, for example, might produce about ten million pounds of resin (solids basis) yearly of one type of product but be limited to around 3 million pounds of another product, and production schedules vary according to market conditions.⁽²⁾ In recent years, Union Carbide, Monsanto, Pacific Resins and Reichhold Chemicals have been the largest producers.

In addition to resins, the primary products of the industry include compounds made by mixing phenolic resins with lubricants, fillers, dyes, and plasticizers. Both the one-step resins and novolaks are used. Phenolic compounds are formulated to suit a variety of applications and are usually identified as general-purpose, impact-resistant, heat-resistant, electrical and special-purpose types. They are made by processing the ingredients on heated rolls, cooling the resultant sheet, and grinding to the desired specification. At the time of the hearing, there were two producers of moulding compounds for sale, the Bakelite Division of Union Carbide at its plant at Belleville, Ontario and the Varcum Chemical Division of Reichhold Chemicals (Canada) Limited at Lindsay, Ontario; only these two companies are known to manufacture the dry form of resin required for making compounds. The compounds are usually moulded by compression and these materials are characterized by their dimensional stability, chemical and heat resistance, and general stability over a wide range of temperature. They are used in the production of hard and rigid durable parts of almost any form and dimension such as bottle caps and closures, telephone hand sets, washing machine agitators, appliance handles and a large variety of electrical components such as electric wall plug plates and other wiring devices.

Although the growth of the phenolics industry has not been as spectacular in recent years as has that of some other plastics, the industry has experienced expansion. As the largest portion of the phenolic resin made in Canada finds its outlet in the plywood industry, the growth of phenolics is, of course, closely dependent upon the development of this important Canadian industry. This growth, together with the growth of other outlets such as the moulding compounds, wiring devices and machine and appliance parts has resulted in the manufacture of phenol-formaldehyde resins becoming the largest in the thermosetting field and the third or fourth largest of all the plastics manufactured in Canada.

The Market

According to estimates published in Canadian Plastics, and generally accepted by the phenolics producers,⁽³⁾ demand for phenolic resins has experienced a rather modest increase in the last six years.

(1) Transcript, Vol. 125, p. 18681, 18685

(2) Same, Vol. 125, p. 18676

(3) Same, Vol. 125, p. 18679

Canadian commercial consumption in 1957 amounted to about 50.5 million pounds of resins on a dry basis excluding captive use. In 1963, it had increased by about 9 per cent to 55 million pounds made up of about 49 million pounds produced in Canada and over 6 million pounds of imported material, a smaller portion of total supply than in 1957. In addition, in 1963, about 20 million pounds apparently were produced for captive use. About 10 million pounds, out of the 55 million pounds of resins consumed commercially in 1963, was in dry form. There has been a small growth in demand for moulding powders in such uses as automobile parts, wiring devices and washing machine parts. Powder resins, used to bond brake linings, grinding wheels, sand paper and foundry sand, also reflected a moderate growth. The major proportion of the increased use of phenoplasts in Canada, however, was in that devoted to the plywood and hardboard industry. A breakdown of the Canadian market by major uses indicates that close to 60 per cent of the consumption of phenol-aldehyde resins in 1963 was in plywood, hardboard, and woodmaking adhesives. Another 25 per cent was for laminates and moulding compounds, divided almost equally between them. The distribution by main uses was as follows:

The Market for Phenolic Resins, 1963

	<u>1963</u> <u>'000 lb.</u>	<u>Percentage</u> <u>Distribution</u> <u>%</u>
<u>Liquid Resins (dry basis)</u>		
Hardboard and plywood adhesives	32,000	58.2
Laminates, resin for sale and captive use	7,000	12.7
Insulation Fiber binder	5,000	9.1
Paint and varnish	1,000	1.8
<u>Dry Resins</u>		
Moulding compounds	7,000	12.7
Other (including brake linings, tank linings, sand paper, grinding wheels, foundry resins, etc.)	<u>3,000</u>	<u>5.5</u>
Total	<u>55,000</u>	<u>100.0</u>

Source: Canadian Plastics, February, 1964, p. 41

The Plywood Manufacturers Association of British Columbia pointed out that the plywood industry consumes more than 55 per cent of the phenolic resins produced in Canada. ⁽¹⁾ The Association also indicated that in 1949 about 8 million pounds (gross weight) of phenol-formaldehyde resins in aqueous solution valued at about \$676,000 were consumed by the plywood industry in British Columbia. By 1962, these amounts had greatly increased, to about 67,706,000 pounds valued at \$5,452,000. ⁽²⁾ The major consuming industries for the resins were located in British Columbia, Ontario and Quebec, but fairly large amounts were also consumed in other provinces.

(1) Transcript, Vol. 129, p. 19267

(2) Same, Vol. 129, p. 19272. The discrepancy between the Association's poundage figures and those in the preceding table apparently results from inclusion, in the Association's figures, of the water content

In 1963, the value of Canadian shipments was over \$10 million and the value of imports \$1.8 million, indicating a market of \$12 million; exports are small. The value of factory shipments of phenol-formaldehyde resins apparently did not increase from 1957 to 1960. However, the value of shipments in 1963 was about 17.1 per cent higher than in 1960. Over the longer period, some decline in prices occurred so that the increase in the volume of resins shipped was greater than is indicated by the value comparisons.

Factory Shipments of Phenol-Formaldehyde Resins, 1957-63

	<u>\$'000</u>
1957	8,940
1958	9,101
1959	8,912
1960	8,902
1961	9,536
1962	10,242
1963	10,427

Source: D.B.S., Manufacturers of Plastics and Synthetic Resins, Catalogue No. 46-211

Although data are incomplete, imports of phenol-formaldehyde resins apparently have not increased appreciably in recent years. On a dry-resin basis, Canadian Plastics estimated imports to be about 6.8 million pounds in 1957. In 1962, the first year for which the D.B.S. published the data, imports of phenol-formaldehyde resins (gross weight basis) amounted to nearly 7.5 million pounds, valued at \$2.3 million; in 1963, to 6.5 million pounds valued at less than \$2 million and in 1964, to 7.9 million, valued at \$2.1 million. In addition, there may be some imports of relevant products that are not included in these data. The average value of imports, in 1962, was about 31 cents a pound and declined to approximately 27 cents in 1964. More than 95 per cent of imports originate in the U.S.A.

Imports of Phenol-Formaldehyde Resins and Compounds,
by Region, 1962 and 1963

<u>Region</u>	<u>1962</u>		<u>1963</u>	
	<u>'000 lb.</u>	<u>\$'000</u>	<u>'000 lb.</u>	<u>\$'000</u>
Atlantic	38	9	6	2
Quebec	1,462	406	787	259
Ontario	5,380	1,695	4,618	1,474
Prairies	519	171	119	36
British Columbia	<u>63</u>	<u>22</u>	<u>952</u>	<u>79</u>
Total	7,462	2,303	6,482	1,850

Source: D.B.S., Trade of Canada, Imports

In 1963, about 83 per cent of the quantity of imports were entered in Ontario and Quebec. The largest portion of phenolic resin imports was reported to be in the form of moulding resins and compounds, including particular moulding compounds not available from Canadian production.⁽¹⁾ Duty-free imports of liquid phenol-formaldehyde for use in the manufacture of plywood accounted for about 5 per cent of the total in 1962 and for 11 per cent in 1963.

Published data on exports of phenol-formaldehyde are not available. Exports were said to be small, possibly 5 or 6 per cent of the Canadian market which would suggest a value of about \$500,000 in 1962.⁽²⁾ Since the U.S.A. has a relatively high customs tariff on phenoplasts, exports to that country were said to be negligible; most of the Canadian exports were to South Africa, Australia, South America and Europe.

Pricing Policy and Prices

Many phenol-formaldehyde resin grades are sold on a delivered basis; the plywood grades and hardboard binder type, however, are sold f.o.b. plant. Published prices for a number of grades are given below.

Prices of Phenol-Formaldehyde Resin in 1964

	High	Low
Cents per pound, delivered		
Thermal insulation, tankload,		
Eastern Canada	16.50	16.00
British Columbia	20.55	11.10
Laminating, Tankload, Eastern Canada	20.00	17.25
Abrasive bonding, truckload, Eastern Canada	37.00	34.75
Foundry bonding, same basis	30.00	22.00
Brake-lining, same basis	46.00	32.00
Coating, same basis	62.50	31.75
Plywood grades, British Columbia and Alberta		
Tankloads, f.o.b. plant	7.64	6.64
Plywood grades, British Columbia and Alberta,		
Carload	9.14	8.14
Hardboard binder, British Columbia and Alberta,		
Tankload, f.o.b. plant	6.64	..
Drums, carload, f.o.b. plant	8.14	..

Source: Canadian Chemical Processing, July, 1964, p. 12. [Prices of plywood grades apparently are for gross weight, including solution, with about 44% solids content]

(1) Transcript, Vol. 125, p. 18679; Vol. 127, p. 19087

(2) Same, Vol. 125, p. 18739

Prices on plywood grades were said to be lower in British Columbia than in the eastern markets. The price differential between the two regions was quoted usually at about 2¢ per pound, dry-resin basis; for example, prices were about 20 cents per pound in the East and 18.2 cents per pound in the West.⁽¹⁾ The reason for this difference was said to be the wide dispersion of the plywood industry in Eastern Canada which results in the inclusion of higher freight charges in prices in that region. Prices of most grades, except plywood, have remained unchanged since 1959. Prices of plywood resins in Canada and the U.S.A. experienced the following decline:

Prices of Phenolic Plywood Resin, 1957-63		
	Canada	U.S.A.
	¢ per lb. solids	¢ U.S. per lb. solids
1957	26.2	27.8
1958	26.2	27.2
1959	21.8	22.5
1960	22.2	24.4
1961	20.6	20.0
1962	19.6	18.0
1963	18.2	16.9

Source: Transcript, Vol. 125, p. 18680

The prices of phenol-formaldehyde resins in Canada were said to be within three or four per cent of the prices in the United States; many of the products are sold at about the same prices in the two countries. The general purpose material was quoted as being 20.5 cents in the U.S.A. (U.S. funds) and 23 cents in Canada. It was mentioned at the public hearing that prices of phenolic moulding compounds may vary from 20 cents to as much as \$12 a pound according to grade.⁽²⁾

Laminates

A laminated product, as classified under B.T.N. 39.01, consists of a multilayer construction of fibrous sheets impregnated with resin such as phenol-formaldehyde and compressed together. For classification under heading 39.01, the products are of a hard, rigid character. The manufacturer of industrial phenoplast laminates normally uses phenol-formaldehyde in an organic solvent; the base material might be absorbent rag, kraft paper, asbestos and cotton, glass and synthetic fabrics. For some applications, the sheets are surfaced with metal or rubber.

(1) Transcript, Vol. 125, p. 18710

(2) Same, Vol. 126, p. 18884; Vol. 127, p. 19066, 19080

The manufacturing process consists of impregnating and coating a continuous web of the filler by passing it through a bath of the resin solution; then the solvent is removed by evaporation and the resin is further processed to a point suitable for moulding. The impregnated product in laminate or layers is subjected to heat and pressure to fuse the material into a dense solid mass in the form of sheets, tubes and other shapes.

Phenolic laminated products are used where properties such as mechanical and electrical strength and resistance to heat, flame, moisture, and mild acid and alkalies are required. Laminated products are put to a variety of uses such as the production of machines and punched parts for the electronic equipment and communication facilities. Copper-surfaced sheet is used for printed circuits for radios, televisions, computers and guided missile controls. Sheet material has a major application in making gears. Because of the high strength-weight ratio, phenolic products are used in a large variety of structural uses, aircraft and industrial applications.(1)

At the beginning of 1963 there were three manufacturers of industrial laminated products:

	<u>Plant Location</u>
The Arborite Company, Division of Domtar Construction Materials Ltd.	LaSalle, Quebec
Cyanamid of Canada Limited, Building Products Department	St.-Jean, Quebec
Union Carbide Canada Limited, Bakelite Division	Belleville, Ontario

Source: Transcript, Vol. 125, p. 18759

The Arborite Company makes a variety of products including decorative plastic laminates, industrial paper and cloth base laminates and vulcanized fibre product. Similarly, Cyanamid makes a variety of laminates for use in the manufacture of furniture tops. The Bakelite Division of Union Carbide, on the other hand, is mostly engaged in the manufacture of industrial laminates for electronics, communications and other industries.

Other Phenol-Formaldehyde Products of Heading 39.01

A fairly large portion of phenol-formaldehyde resin finds its outlet in the manufacture of moulded articles such as distributor caps for automobiles, wiring devices, electronic parts, telephone parts and components, switchboards, cooking utensil handles and knobs.

(1) Transcript, Vol. 125, p. 18738

The number of moulders, mostly located in Ontario and Quebec, was estimated at more than 40;(1) most were said to be custom moulders, though there are some "captive moulders" with one or two small moulding machines. In general, many of these moulders were represented as being small, but there are important exceptions such as Canadian General Electric, Northern Electric, Cyanamid of Canada (Rainbow Division) and Canadian Westinghouse.(2)

The balance of the market, some 15 per cent, is represented by the requirements for paint and varnish, fibrous glass insulation and a number of other products.

Tariff Considerations

Although many tariff items were brought to the attention of the Board relevant to the phenoplasts, the following would appear to be the most significant:

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
901(a) Synthetic resins without admixture, including scrap or waste:		
1. Phenol-aldehyde type	7½ p.c.	7½ p.c.
(b) Synthetic resins in the form of aqueous emulsions, aqueous dis- persions or aqueous solutions, without admixture:		
1. Phenol-aldehyde type	7½ p.c.	7½ p.c.
(c) Synthetic resins in organic solvents where the solvent is not more than 60 per cent by weight, without other admixture:		
1. Phenol-aldehyde type	12½ p.c.	12½ p.c.
902 Synthetic resins, compounded with other materials, in any form, including scrap or waste, for moulding, casting, extruding, calendering, pressing, (moulding compositions or materials for pro- cessing into moulding compositions); synthetic resins compounded with other materials in the form of not fully cured preforms or not fully cured blanks for compression mould- ings:		
(a) Phenol-aldehyde type	10 p.c.	15 p.c.

(1) Transcript, Vol. 127, p. 19172

(2) Same, Vol. 128, p. 19174, 19183

<u>Item</u>		<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
903	Synthetic resin glues or adhesives, composed of synthetic resins compounded with other materials	15 p.c.	17½ p.c.
904	Synthetic resin compositions, n.o.p.	15 p.c.	15 p.c.
905	Synthetic resin plates, sheets, film, sheeting or strips, not less than 6 inches in width, n.o.p.; synthetic resin lay-flat tubing, not less than 6 inches in circumference, n.o.p.:-		
(a)	Phenol-aldehyde type, not further manufactured than cast	Free	Free
906	Synthetic resin plates, sheets, film, sheeting or strips, less than 6 inches in width, lay-flat tubing less than 6 inches in circumference, other tubing blocks, bars, rods, non-textile monofilament; synthetic resin profile shapes produced in uniform cross-section and imported in lengths; not further manufactured than moulded, cast, calendered, extruded or pressed, n.o.p.:-		
(a)	Phenol-aldehyde type cast	Free	Free
916	Laminated moulded plastics products, n.o.p., having synthetic resins or cellulose plastics as the chief bonding (impregnating) agents	15 p.c.	15 p.c.
917	Reinforced or supported synthetic resin or cellulose plastics plates, sheets, sheeting, strips, tubing, blocks, bars, rods, in which is incorporated a layer of paper, fibreboard, or textile fabric, or a core of fibres whether matted or otherwise arranged, n.o.p.:-		
(b)	Other	15 p.c.	15 p.c.
925	Phenol-aldehyde resins without admixture or in the form of aqueous emulsions, aqueous dispersions or aqueous solutions, without admixture, for use in the manufacture of plywood	Free	Free

In addition to the general briefs dealt with in the introductory section, there were sixteen submissions regarding phenol-formaldehyde resins and other phenolic products. Five of the six resin manufacturers making submissions recommended an increase in the rates of duty. Union Carbide Canada Limited requested that phenolic resins, both as synthetic resins without admixture and modified by the introduction of other substances, in the form of solutions, moulding compounds, adhesives, compositions and laminated products as classified under the B.T.N. 39.01, be dutiable at 15 p.c., B.P. and 20 p.c., M.F.N.⁽¹⁾

Canadian General Electric Company Limited supported the heading rates of 15 p.c., B.P. and 20 p.c., M.F.N. recorded by the Industry Committee.⁽²⁾ Monsanto Canada Ltd. also recommended that phenol-aldehyde resins be classified according to B.T.N. heading 39.01 and be dutiable at 15 p.c., B.P. and 20 p.c., M.F.N.⁽³⁾ The Borden Chemical Co. supported Monsanto's proposal.⁽⁴⁾ Reichhold Chemicals (Canada) Limited indicated "substantial" agreement with the rates and classification recorded by the Industry Committee under B.T.N. heading 39.01⁽⁵⁾ but, as noted below, also supported retention of existing tariff item 925. Schenectady Varnish Canada Ltd. also supported the Industry Committee's proposal for the adoption of the Brussels Nomenclature for resins and plastics, with uniform rates of 15 p.c., B.P. and 20 p.c., M.F.N. for products classified under B.T.N. heading 39.01. The company further proposed the elimination of "end use" items and the cancellation of the not-made-in-Canada status "if identical products are made in Canada, or if products satisfactory for substitution over a substantial area of consumption of imports are made in Canada."⁽⁶⁾ Schenectady asked, in particular, that products now imported duty-free under tariff item 901(a)7 be ruled as of a class or kind made in Canada.

Pacific Resins, Ltd., successor to Canadian Marietta Ltd., a manufacturer of phenolic resins for use in the manufacture of plywood in Western Canada, recommended that no duty be applied on phenolic resins or on the raw materials entered under tariff items 921, 922 and 925.⁽⁷⁾

Two companies, Dow Chemical of Canada Ltd., a manufacturer of phenol, and Shawinigan Chemicals Limited, manufacturing both phenol and formaldehyde, supported the recommendation of the resin manufacturers for rates of 15 p.c., B.P. and 20 p.c., M.F.N. under B.T.N. heading 39.01; both companies also requested the elimination of end-use items 922 and 925.⁽⁸⁾

(1) Transcript, Vol. 125, p. 18722

(2) Same, Vol. 129, p. 19362

(3) Same, Vol. 125, p. 18675

(4) Letter to Tariff Board, Feb. 27, 1963

(5) Transcript, Vol. 126, p. 18862

(6) Same, Vol. 127, p. 18930

(7) Same, Vol. 174, p. 28568

(8) Same, Vol. 127, p. 18995, 19037

The consumers, in general, were opposed to any increase in rates of duty on phenol-formaldehyde resins and, in particular, on the type used in the manufacture of plywood. The spokesman for Abitibi Power and Paper Company Limited proposed at the public hearing that phenolic-formaldehyde resins should continue to be entered at $7\frac{1}{2}$ p.c., B.P. and $7\frac{1}{2}$ p.c., M.F.N., under item 901(b), with continuation of duty-free entry under end-use item 925 which might be extended to include hardboard.⁽¹⁾ Jamar Flakeboard Limited, producer of flakeboard and hardwood plywoods in Northern Ontario, opposed the imposition of duties on phenol-formaldehyde resins.⁽²⁾ The Plywood Manufacturers Association of British Columbia made a submission on behalf of the following companies:

British Columbia Forest Products Limited
 Canadian Collieries Resources Limited
 Canadian Forest Products Limited
 Crown Zellerbach Building Materials Limited
 Douglas Plywood Limited
 Evans Products Company Limited
 MacMillan, Bloedel & Powell River Limited
 Richmond Plywood Corporation Limited
 S.M. Simpson Company Limited
 Victoria Plywood Limited
 Western Plywood Company Limited

The Association requested that tariff item 925 be retained at the existing rates and that the raw materials used in the manufacture of phenol-aldehyde resins also be accorded free entry.⁽³⁾ The Poplar Plywood Association, representing six private mills located in Central and Eastern Canada reported to be the principal users of phenolic plywood resins in that area, and the Canadian Lumbermen's Association supported the proposal of the Plywood Manufacturers Association of British Columbia.⁽⁴⁾ Reichhold Chemical (Canada) Limited also supported the Plywood Manufacturers' proposal for free entry of phenol-formaldehyde under the end-use item.⁽⁵⁾

The Canadian Pulp and Paper Association opposed increases in rates of duty on chemicals used in the pulp and paper industry and listed phenol-formaldehyde resins as materials used.⁽⁶⁾ The moulders, like the plywood producers, were opposed to an increase in duty rates on phenoplasts.

In a joint submission, the following companies proposed that phenolic moulding compounds, admissible under tariff item 902(a), be duty-free when of a kind not made in Canada, and bear a rate of 5 p.c., M.F.N., when of a kind made in Canada.⁽⁷⁾ The companies were:

- (1) Transcript, Vol. 128, p. 19187, 19215
- (2) Same, Vol. 129, p. 19355
- (3) Same, Vol. 129, p. 19268
- (4) Same, Vol. 129, p. 19349-50
- (5) Same, Vol. 126, p. 18903
- (6) Same, Vol. 36, p. 5246; Vol. 129, p. 19359
- (7) Same, Vol. 127, p. 19064

Armstrong Cork Canada Limited
 Bach-Simpson Limited
 Beck Electric Manufacturing Company Limited
 H.B. Etlin Company Limited
 Klockner-Moeller Canada Limited
 Leviton Manufacturing of Canada Ltd.
 Mitchell Plastics & Buttons Ltd.
 Plastomer Limited
 Thermoset Plastics (Guelph) Limited

Thermoset Plastics also made a separate submission requesting that rates of duty on phenolic compounds be greatly reduced or, preferably, be removed entirely.

The Rubber Association of Canada proposed that duties on synthetic resins and plastics, and materials used in their manufacture, be no higher than they now are. The Association listed phenol-aldehyde and phenol resorcinol formaldehyde resins among those of interest to members of the Association.⁽¹⁾

Among other consumers, the Primary Textiles Institute requested that phenol-formaldehyde resins used as binders for pigments and inks and for use in the coating, colouring or printing of textiles, which are now classified under tariff item 203d, and believed to fall under B.T.N. heading 39.01, be accorded free entry. The Institute was, in fact, proposing the continuance of the end-use items, modified as follows, under B.T.N. heading 39.01:

"Binders for pigments and printing inks, for use in the coating, colouring, or printing of textiles, when of a kind not made in Canada."⁽²⁾

An importer of industrial raw materials, Harrisons & Crossfield (Canada) Limited, asked that rosin esters, phenol-aldehyde modified, such as Pentalyn B-25, (phenolic-modified rosin used in paints and varnishes, with 60 per cent resin solids) Pentalyn 802A, (phenolic-modified pentaerythritol ester of rosin, used in paints and varnishes, and inks with 50 per cent resin solids) and Pentalyn 833 (phenolic-modified pentaerythritol ester of rosin, used in inks, and paints and varnishes, 60 per cent resin solids) continue to enter free of duty under tariff item 901(a)7, except when they contain solvent; those products containing solvent should remain under tariff item 901(c)4 at 12½ p.c., both B.P. and M.F.N.⁽³⁾ Similar representations were made by the company for other products noted in the section below on "Other Resins of Heading 39.01" and under heading 39.05.

Arguments in Support of Tariff Proposals

Some manufacturers of phenol-formaldehyde resin, in support of their proposals, stressed that existing domestic capacity was more than sufficient to meet the demands of Canadian consumers. It was their view that, because of the relatively small size of the Canadian

(1) Transcript, Vol. 123, p. 18401, 18405; Vol. 165, p. 24365

(2) Same, Vol. 163, p. 24151

(3) Same, Vol. 161, p. 23873

market for these resins, tariff rates should be set so as to preserve this market for the domestic producer and thereby minimize unit costs of manufacturing, development and technical service.(1)

Another problem which concerned producers arose from the fact that the duty on their raw materials was sometimes higher than the duty on the resins. In this connection the spokesman for Union Carbide expressed the opinion that the present duties of $7\frac{1}{2}$ p.c., B.P. and M.F.N. on phenolic resins were inadequate to compensate for higher duties on raw materials such as the 15 p.c., B.P. and 20 p.c., M.F.N. rates on phenol (which accounts for as much as 80 per cent of the material cost of the phenolic resin).(2) Reichhold Chemicals held that the company's competitive position was being adversely affected because duties on its raw materials made them more expensive than the raw materials available to foreign competitors. The company's representative went on to say that:

"it should be pointed out that we use at least ten major raw materials which carry higher rates of duty than apply to our finished products. Most of these materials are classified under Tariff Item 711."(3)

and further:

"high rates of duty have been proposed for materials which can now be imported under 921, 923 and other duty free end-use items. These proposed rates are higher than those which now apply to our finished products. We feel that this must be changed, as it seems unfair to have higher duties apply to our raw materials than to finished goods produced from these materials."(4)

Monsanto stressed particularly this issue of higher duties on raw materials:

"we are proposing a duty which will be commensurate with the duties which are being proposed for raw materials, and this is our principal reason for requesting these duties. Apart from that, we feel that in this particular area we are efficient manufacturers as compared, for example, to our counterparts in the United States, and that barring any drastic drop in the prices caused by unusual circumstances we would be able to keep pace with those producers with respect to price, other things being equal."(5)

This view, that the major problem arose from the duties on raw materials, was not entirely shared by some other producers who pointed to the competitive advantage which U.S. manufacturers of resins obtained because of plants of larger capacity, longer production runs and integrated production of raw materials. This situation prompted the spokesman for Union Carbide to state that:

(1) Transcript, Vol. 129, p. 19362

(2) Same, Vol. 125, p. 18732

(3) Same, Vol. 126, p. 18863

(4) Same, Vol. 126, p. 18863

(5) Same, Vol. 125, p. 18708

"The fact that the industry has been sufficiently vigorous to continue operations under these adverse conditions is a proof of its present efficiency. The assurance of as large a share as possible of the available Canadian market in the future is essential to finance the process and product development necessary to maintain this position."(1)

The spokesman also indicated that there was very little margin between cost and sales price at the present time because of the effect of both foreign and domestic competition.

Reichhold Chemicals also felt that tariff protection at 15 p.c., B.P. and 20 p.c., M.F.N. was essential to the growth of its business and suggested that the present rates of duty on these resins were too low to give potential customers the incentive to examine and evaluate Canadian-made substitutes for American imported items.(2) With reference to plywood resins now imported free of duty under tariff item 925, Reichhold explained its support for continuance of this end-use provision on the grounds that production of these resins on the West Coast was not threatened by foreign competition, principally because there was no duty on raw materials and because the operation was on a larger scale, lower cost basis than was that of other phenolic resins.(3)

Pacific Resins Ltd., another manufacturer of phenolic resin for use in the plywood industry, opposed increased rates and indicated that, as an advocate of free trade, the company took the view that no duty should be applied on either the phenolic resin or its raw materials.(4)

The proposals by Shawinigan Chemicals and Dow Chemical, the raw material producers, for rates of 15 p.c., B.P. and 20 p.c., M.F.N. on phenolics and removal of end-use items was justified, by Shawinigan Chemicals, on the grounds that there was no need for tariff items 922 and 925 since the suppliers would have to meet duty-free prices (because of the drawback provisions) on glue used by the potential exporters of plywood and, moreover, "exports would not be harmed if a duty of 15 p.c., B.P., 20 p.c., M.F.N. were provided on the glue."(5) The spokesman for Shawinigan Chemicals thought that a duty on the resin would not be any threat to the B.C. plywood producers "who are quite capable financially and technically of making their own resins"(6) and would presumably do so if the present resin producers took undue advantage of the tariff. Dow Chemical more generally took the view that if rates of 15 p.c., B.P., 20 p.c., M.F.N. were established for chemicals, the producers would be assisted in supplying the Canadian market for those products which could be produced profitably with such protection.

(1) Transcript, Vol. 125, p. 18741

(2) Same, Vol. 126, p. 18862

(3) Same, Vol. 126, p. 18903

(4) Same, Vol. 174, p. 28568

(5) Same, Vol. 127, p. 18996

(6) Same, Vol. 127, p. 19003

The principal consumers, the plywood manufacturers, did not share Shawinigan Chemicals' views. They were opposed to any duties on phenol-formaldehyde resin used in the manufacture of plywood on the grounds that it was an important cost factor in the production of their product and that any increase in its price would adversely affect the industry's competitive position. They regarded tariff item 925 as the "bulwark against unjustifiable increases in the cost of our resin."⁽¹⁾ The spokesman for the Plywood Manufacturers Association of B.C. said that no phenol-formaldehyde resin had been imported by that industry in 1962 and that:

"the resin manufacturers in Canada have demonstrated their ability to meet all competition without tariff protection and presumably make a profit. We can only assume that tariff protection would be used to further increase profits."⁽²⁾

The Poplar Plywood Association in its opposition to any tariff on phenolic plywood resins explained that the individual units of their industry are very much smaller and much more subject to exploitation by large chemical companies than the west coast producers.

Other consumers, such as the moulders, mainly interested in compounds, contended that an increase in rates on moulding materials without an increase of duties on finished mouldings, would result not only in increased imports of finished products but also would place the Canadian moulder, in his efforts to compete against imports, at the complete mercy of the domestic material manufacturer. They pointed out that since many phenolic compounds are not produced domestically the only effect of duties would be to raise costs and weaken the moulders' competitive position. The following excerpt is taken from the joint submission presented by a group of moulding companies.

"The Canadian market for phenolic moulding compounds has been supplied by two producers for many years (thirty years and fifteen years). At the present time, and despite a long period of operation under a 15 per cent tariff protection, a price differential exists between general purpose phenolic compounds produced and available in Canada (23 cents per pound), and general purpose phenolic compounds produced and available in the United States (20½ cents per pound) ... One effect of this differential has been to hamper the efforts of Canadian moulders who invariably find themselves competing with moulded parts produced in and imported from the United States and other countries, and who are unable to participate fully in both the domestic and export markets not because of a lack of engineering skill or technical knowhow, but because of the high cost of moulding compounds in Canada ... tariff protection and lack of vigorous competition in the marketing of phenolic moulding compounds has led to a lack of development of Canadian produced materials. This has permitted moulders in other countries, operating with lower material costs, and with more efficient materials, to export moulded parts over the tariff wall into Canada in competition with Canadian moulders ... If Canadian

(1) Transcript, Vol. 129, p. 19269

(2) Same, Vol. 129, p. 19267

moulders are to be placed in a favourable competitive position so that they may supply both internal and export markets at low cost and with high quality products, it becomes a necessity to have reasonable access, at competitive prices, to supplies of moulding compounds possessing the most desirable characteristics."⁽¹⁾

The moulders also claimed that the exclusion of imports of compounds through relatively high tariff duties would deprive them of technical knowhow which is available from U.S. suppliers but which is not provided by the Canadian producer who does little or no research.

These views were contested by the spokesman for Union Carbide in the following terms:

"We do make a great variety of moulding compounds. I am told that there are sixty types at least of moulding compounds which we make in Canada. We still stick to the statement which was made earlier that we believe we can provide, and are able, have the ability and capacity and know-how to provide, the Canadian requirements ... Of course, the problem in this field is the question of specifications ... It is a question of the customers of the moulders often being U.S. subsidiaries, and just quoting U.S. specifications."⁽²⁾

It was also suggested by this spokesman that the brief presented by the moulders, which included only nine out of a total of about forty-six moulders, was representative of only about 20 per cent of the market.

The moulders suggested that there were two alternative methods of tackling their problem: first, the reduction of the tariff rates on the moulding material; secondly, an increase in the tariff on the moulded product. It was their view that an increase on the moulded product was detrimental to the field in general but they were open to discussion on that point. As noted above, the moulders wanted to keep down the costs of moulding materials in Canada.

In regard to the adoption of the B.T.N., the moulders expressed doubt as to the desirability of Canada adopting this Nomenclature having in mind that the U.S.A. has not done so and that the Brussels system might not be entirely suited to the intimate and unique system of relations that had grown up between the two countries.

Analysis of Proposals

The phenol-formaldehyde industry in Canada is faced with two, more or less distinct markets, geographically separate from one another and each consuming, in the main, a different type of phenolic resin. The western consumers, largely the plywood industry, obtain their resin in the form of an aqueous solution from plants in Alberta and British Columbia. These plants are located close to centres of consumption and avoid the high transportation costs that would apply to a product with such a large water content if it were to be shipped longer distances; they are specialized in the manufacture of plywood resin and

⁽¹⁾ Transcript, Vol. 127, p. 19056, 19057, 19060

⁽²⁾ Same, Vol. 128, p. 19166

their future is closely tied to that of the plywood industry. In these circumstances it is not unexpected that producers and consumers in Western Canada agreed in recommending continuance of the end-use item permitting duty-free entry of phenolic resin used in the making of plywood. One resin manufacturer, Monsanto, who also has operations in Quebec, disagreed with the free entry, principally because of the proposed duties on raw materials.

Of interest was the argument put forward by those who supported elimination of the plywood resin end-use item that the plywood industry could produce its own resins if the existing producers took advantage of the tariff to raise prices. Such a hypothesis may well be correct, but the need for testing it is not readily apparent. Under existing arrangements, there are in Western Canada efficient resin plants, scaled to high output and low unit cost, which have operated for some years without protection from international competition.

Production of phenol-formaldehyde resins in Eastern Canada differs greatly from that on the west coast. Plywood resins are only a small proportion of phenolic resins produced in this area; demand is diversified, particularly with respect to moulding resins and compounds. Imported material constitutes a significant portion of the market; in addition, there is a considerable amount of captive production.

Many of the phenolic resins and compounds used by consumers in Eastern Canada are not required in large volume; however, the rates of duty on these resins must be considered in relation to the rates of duty on the products which are made from them, as well as the rates of duty on raw materials and the possibility, in some instances, of providing lower rates of duty on raw materials. It might be noted further that all but one of the four companies that manufacture the resins for sale in Ontario and Quebec have been in operation for some time; they did not place emphasis on any recent changes in their competitive position which gave rise to the need for higher rates of duty, apart from the possibility of higher rates of duty on some raw materials if proposals before the Board were adopted. In particular, no reason was advanced for the proposed rate of 15 p.c., B.P., except that rates of 15 p.c., B.P., 20 p.c., M.F.N. were being generally proposed by the chemical industry and these were the rates which now apply to many raw materials.

Phenolic resins, both as synthetic resins without admixture and modified by the introduction of other substances, in the form of solutions, moulding compounds, adhesives and various other forms, were said to be classified under B.T.N. 39.01; no special problems were brought to the attention of the Board regarding the classification of the various forms of phenol-aldehyde resins under an item worded like B.T.N. heading 39.01.

AMINOPLASTS

This group of resins embraces materials formed by the condensation of aldehydes with amines. Commercially, the most important are urea-formaldehyde and melamine-formaldehyde. Both these plastics display extreme surface hardness with excellent resistance to oils, greases and most solvents. They perform satisfactorily over a wide temperature range and are available in a multitude of light-fast colours.

Production of aminoplasts involves the reaction of such chemicals as urea, melamine or a mixture of these with formaldehyde or other aldehydes under the action of alkali or acid catalysts. The process and facilities required are similar to those used for the phenolics. They are usually manufactured in the form of powder or as aqueous or organic solvent solutions. Although precise data, particularly on a solid resin basis, are not available, it would seem that production in 1964 may have exceeded 30 million pounds which would have a value in excess of \$5 million.

Urea-Formaldehyde

Urea-formaldehyde dry resins are used for the production of moulding compounds which generally include fillers and colouring matter. These moulding compounds are used in the manufacture of such products as cosmetic container closures, electrical housings, electrical parts, stove hardware and button mouldings. Urea-formaldehydes are also offered in the form of sheets and laminates or other semi-manufactured forms. In aqueous solution of 60 to 65 per cent solids content, urea resin is in widespread use as an adhesive in the plywood and furniture industries, in the textile field for crease-proofing of materials such as cotton and rayon, and for improving the wet strength of paper. As solutions in organic solvent the resin is employed in the manufacture of various types of paints and enamels.

The Industry

Most of the companies engaged in the manufacture of phenol-formaldehyde resins also use their facilities to produce urea-formaldehyde. Monsanto Canada Limited has had three plants in operation since the second World War, one in the East and two in the West, all designed for making a large variety of resins in liquid form.⁽¹⁾ A number of other companies have entered the field of making urea-formaldehyde resins more recently with plants in the provinces of British Columbia, Alberta, Ontario and Quebec. In 1964, urea-formaldehyde resins were being manufactured by the following firms:

(1) Transcript, Vol. 125, p. 18678

Urea-Formaldehyde Plants

<u>Company</u>	<u>Plant Location</u>
The Borden Chemical Company (Canada) Limited	North Bay, Ontario
Canadian Industries Limited (Paint Division)	Toronto, Ontario
Clough Chemical Company, Limited	St. Johns, Quebec
Cyanamid of Canada Limited	Niagara Falls, Ontario
The Glidden Company Limited	Toronto, Ontario
Hart Chemical Limited	Guelph, Ontario
Hercules Powder Company (Canada) Limited	Burlington, Ontario
The Lowe Brothers Co., Limited	Toronto, Ontario
Monsanto Canada Limited	Montreal, Quebec
	Edmonton, Alberta
	Vancouver, B.C.
Pacific Resins, Limited	New Westminster, B.C.
Perkins Glue Company of Canada, Limited	Kitchener, Ontario
Reichhold Chemicals Canada Limited	Weston, Ontario
	Port Moody, B.C.
	St. Thérèse, Quebec
Trilon Chemicals Limited	Lachine, Quebec

Source: Compiled from D.B.S. Chemical Directory, Cat. No. 46-502 and Canadian Plastics, February, 1964, p. 40

Six of the above companies, Cyanamid, Pacific Resins, Borden Chemical, Monsanto, Perkins and Reichhold, are principally producers of resins in aqueous solution for plywood adhesives, woodworking adhesives and glues. Clough Chemical, Hart Chemical and Trilon Chemicals manufacture aqueous solutions for textile finishing. C.I.L., the Glidden Company and Lowe Brothers, make resins in organic solvent for their own use in the manufacture of paint. Hercules Powder produces cationic urea-formaldehyde in aqueous solution for imparting wet strength to paper. Reichhold also produces wet strength urea-formaldehyde resins.

Until recently, urea-formaldehyde moulding compounds were not made in Canada. In the summer of 1963, Cyanamid started to manufacture these compounds at Niagara Falls, Ontario and effective 20th November, 1964, the products were ruled "made in Canada" for Customs purposes.

As for the phenolics, production capacity of the urea-formaldehyde plants is difficult to determine because the facilities are designed and used for making a wide range of resins. For example, Monsanto's plants were reported to be used for manufacturing more than 50 different products in liquid form. The Board was told that there appeared to be sufficient capacity in Canada in 1963 to meet domestic demand for urea-formaldehyde resins.⁽¹⁾

⁽¹⁾ Transcript, Vol. 126, p. 18889

The Market

The market for urea-formaldehyde resin in 1962 and 1963 was estimated in a trade journal to be more than 15 million pounds annually, having experienced an average rate of growth of more than 8 per cent a year for the seven years from 1957 to 1964. However, a Tariff Board survey indicated that total use in Canada (shipments, imports and captive use) exceeded 30 million pounds in 1963, valued at more than \$6 million. The available shipments data published by the D.B.S. partially illustrate the growth in the value of consumption of urea-formaldehyde resins. The value of shipments increased by 48 per cent from 1957 to 1963.

Shipments of Urea-Formaldehyde Resins, (a)
1957-63

	<u>'000 lb.</u>	<u>\$'000</u>	<u>Unit Value \$/lb.</u>
1957	14,001	1,759	0.126
1958	15,499	1,995	0.129
1959	18,224	2,091	0.115
1960	(b)	1,931	..
1961	(b)	1,902	..
1962	(b)	2,467	..
1963	(b)	2,606	..

(a) Excluding resins made for captive use but including urea-formaldehyde sold as glue

(b) Quantity data were not published after 1959

Source: D.B.S., Manufacturers of Plastics and Synthetic Resins,
Cat. No. 46-211

One of the main outlets for urea-formaldehyde resins is the plywood industry and these resins are the principal adhesive used in the manufacture of hardwood plywood and particle board in Eastern Canada (in contrast to the phenolics which are the principal adhesives for softwood plywood and hardboard in Western Canada). Abitibi Power & Paper Company Limited was said to supply approximately one third of the market for particle board and to consume about 3 million pounds of urea-formaldehyde resin in the manufacture of particle board. This volume of resin was said to have, on average, a value of about \$400,000. The following table contains an estimate of the volume and value of urea-formaldehyde resin consumed by several industries in 1962, the most recent year for which these data are available.

Consumption of Urea-Formaldehyde Resins by
Selected Industries^(a), 1959, 1961 and 1962

	1959		1961		1962	
	'000 lb.	\$'000	'000 lb.	\$'000	'000 lb.	\$'000
Veneer and ply-wood	8,449	877	7,250	767	9,536	945
Paint and varnish	945	180	971	168	561	194
Plastic fabri- cators	1,788	533	1,124	385	1,403	413
Pulp and paper mills	<u>1,811</u>	<u>147</u>	<u>1,883</u>	<u>173</u>	<u>5,501</u>	<u>529</u>
TOTAL	12,993	1,737	11,228	1,493	17,001	2,081

(a) Including resins in liquid and powder form and moulding compounds

Source: D.B.S., Cat. Nos. 35-206, 46-210, 47-208 and 36-204

Imports of urea-formaldehyde resins were reported to be mostly in the form of moulding compounds and adhesive resins. Prior to the commencement of manufacture of moulding compounds in Canada in 1963, all domestic requirements of the moulding materials had to be imported.

Official import statistics for urea-formaldehyde resins were not available until 1962 but trade estimates indicate average imports of about 3.5 million pounds, dry basis, from 1957 to 1961.⁽¹⁾ Imports of amino-aldehyde resins, believed to be mainly urea-formaldehyde, were shown separately by D.B.S. in 1962. In that year, imports amounted to about 10 million pounds valued at \$2.3 million; imports increased to 12.7 million pounds, valued at \$2.7 million in 1963 and 15 million pounds valued at \$2.8 million in 1964, a decline in the average value of imports from approximately 23 cents a pound in 1962 to about 19 cents a pound in 1964. These average values would suggest a high proportion of moulding compounds in the imported resins from the U.S.A. and the United Kingdom.

Imports of Amino-Aldehyde Resins, by Country of Origin, 1964

Country	'000 lb.	\$'000	Unit Value \$/lb.	Percentage Distribution of Quantity %
United Kingdom	1,847	404.2	0.22	12.3
West Germany	3,495	324.6	0.09	23.3
U.S.A.	9,488	2,064.6	0.22	63.2
Other	<u>186</u>	<u>42.3</u>	<u>0.23</u>	<u>1.2</u>
	15,016	2,835.7	0.19	100.0

Source: D.B.S., Trade of Canada, Imports, Cat. No. 65-007

(1) Canadian Plastics, various issues

It may be noted that the largest portion, about 63 per cent, of imports originated in the U.S.A. and significant amounts also came from the United Kingdom and West Germany. A breakdown of types of resins imported into Canada is not available but the Board was informed that an estimated 1,400,000 pounds of urea-formaldehyde in powder form for plywood and chipboard were imported in 1962 and 2,300,000 pounds the previous year.⁽¹⁾ One of the consumers also informed the Board that this material was available from both Canadian and foreign sources at competitive prices, although it was also said that some of these resins are imported in powder form from overseas with a price advantage over the Canadian producer.

The import share of the Canadian market is difficult to apportion in volume terms because liquid and dry resins often are combined in weight totals. In value terms, in 1963, Canadian shipments were reported to be \$2.6 million and imports, \$2.7 million; however, the average value of Canadian shipments was much lower than that of imports, probably reflecting more expensive specialty grades in imports. As is noted in the following paragraph, Canadian prices for the adhesive grade were reported to be lower than those in the U.S.A. Exports do not represent an appreciable outlet for Canadian production.

Prices and Pricing Policy

Urea-formaldehyde prices are quoted both on a delivered basis and f.o.b. plant, and vary according to resin grades. The Canadian prices have been almost identical in Eastern and Western markets and, in both, significantly lower than those in the U.S.A. The Board was informed that there were imports of European resins offered in the Vancouver area and in Ontario and Quebec at around 13 cents per pound; however, the pressure on prices was said to be coming from internal competition as well as from imports.⁽²⁾

Prices of Urea-Formaldehyde Resin, Adhesive Grade, 1957-63

	Canada		U.S.A.
	<u>Pacific Coast</u>	<u>Ontario and Quebec</u>	<u>Pacific Coast</u>
	¢ per lb., solids, delivered		¢ U.S.
1957	15.4	16	..
1958	15.4	15	..
1959	15.4	15	..
1960	15.4	15	19.2
1961	13.1	14	16.2
1962	13.1	13	16.2
1963	13.1	13	16.2

Source: Transcript, Vol. 125, p. 18680, 18696

(1) Transcript, Vol. 129, p. 19254

(2) Same, Vol. 125, p. 18698

The reported prices in Canada, therefore, have experienced a decline of more than 2 cents per pound in six years, while U.S. prices have decreased at a faster pace, from about 19.2¢ in 1960 to 16.2¢ in 1963, or about 3 cents per pound in three years. For the last four years, prices for adhesive-type resins have been quoted at 8.5 cents per pound in British Columbia and Alberta, and at 9.5 cents in places east of Alberta;⁽¹⁾ these presumably are on a gross weight basis, including solvent.

Prices of urea-formaldehyde moulding compounds were said to be about equal in Canada and the U.S.A. at 32 cents per pound,⁽²⁾ though prices vary considerably according to the grade and the quantity purchased; prices range from about 30 cents to nearly 70 cents a pound.

Melamine-Formaldehyde

Melamine resins, similar in general characteristics to urea resins, are more resistant to water and heat and are considered to be more durable and versatile than most other thermosetting materials. One of the important applications of melamine-formaldehyde resins, in the form of moulding compounds, is in the manufacture of dinnerware. The resins are also widely used in decorative laminates for homes, restaurants and offices. Other uses include adhesives, textile treatment, the manufacture of fast drying enamel finishes and wet strength paper.

Moulding compounds of melamine-formaldehyde are generally made with cellulose filler, with or without colouring matter. The syrup-like product formed by reacting melamine with formaldehyde is mixed with purified alpha-cellulose to form a white, pulpy mass which is dried and ground to a fine powder. Generally, at a certain stage of the operation, dyes, lubricants and catalysts are added; the product is crushed and the finished moulding material is sold in the form of granules with a wide variety of fillers. Moulding compounds are approximately 50 per cent alpha-cellulose pulp, impregnated with melamine-formaldehyde, coloured as desired.

Laminating resins, essentially di- or trimethylol melamines, are used in the production of decorative laminates and also in the manufacture of fire-resistant industrial and electrical grade laminates. The laminates are usually assembled with a core of several sheets of phenol-formaldehyde impregnated kraft paper. The core is surfaced with a pigmented sheet often printed with a decorative design, and finally a thin melamine resin impregnated overlay sheet is applied. Impregnation of the sheets is carried out by passage through a resin bath.

(1) Canadian Chemical Processing, various issues

(2) Transcript, Vol. 126, p. 18804, 18810

The Industry and Market

Until recently, only liquid melamine resins were produced in Canada; the manufacturers included Monsanto Canada Limited at Montreal, Quebec; Reichhold Chemicals at Weston, Ontario; Cyanamid of Canada Ltd., at Niagara Falls, Ontario and Canadian Industries Limited at Toronto, Ontario. C.I.L. manufactures solely for its own use. In 1963, Cyanamid of Canada became the only Canadian producer of the raw material, melamine, for melamine formaldehyde resins and moulding compounds.⁽¹⁾ The operation was reported to be fully integrated to include also the moulding of consumer products; dinnerware and trays are made at Buckingham, Quebec and formica decorative laminated at St. Jean, Quebec. Other manufacturers of laminates include the Arborite Division of Domtar at Montreal, Quebec, and the Bakelite Division of Union Carbide at Belleville, Ontario.

Consumption of melamine-formaldehyde resins in Canada was estimated at about 9.8 million pounds in 1962 increasing to 11.5 million pounds in 1964, made up as follows:

Consumption of Melamine-Formaldehyde Resins, 1962-64

<u>Uses</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>	Percentage Distribution, <u>1964</u>
	'000 lb., dry basis			
Moulding powder	4,800	5,000	5,500	48.0
Surface coatings (a)	1,400	1,450	1,550	13.6
Adhesives	350	300	300	2.6
Decorative laminates and other	<u>3,300</u>	<u>3,420</u>	<u>4,100</u>	<u>35.8</u>
TOTAL	9,850	10,170	11,450	100.0

(a) Liquid form

Source: Canadian Plastics

In contrast with urea-formaldehyde resins, adhesives were the smallest outlet for melamine-formaldehyde; only small amounts are used in the manufacture of waterproof grades of plywood.⁽²⁾ The largest use is of moulding compounds for making dishes, buttons and similar products, the principal markets being in Ontario and Quebec. Other applications, in order of importance, were decorative laminates and other types of laminates and surface coatings including the hard finishes on automobiles and washing machines.

⁽¹⁾ Transcript, Vol. 126, p. 18790

⁽²⁾ Same, Vol. 126, p. 18813

Because of the small number of melamine-formaldehyde manufacturers, data on production or shipments are not published. However, from the estimate of consumption and the data on imports, it would seem that Canadian production was of the order of 4 million pounds in 1963 and 7 million pounds in 1964.

Imports of melamine-formaldehyde resins and compounds were more than 6.5 million pounds, valued at nearly \$2.5 million in 1962; in the following year, they decreased by about 8 per cent to 6 million pounds valued at \$2.2 million, and declined further in 1964 to 4.7 million pounds, valued at \$1.6 million. Nearly all of these imports came from the U.S.A.

Imports of Melamine-Formaldehyde Resins,
1963 and 1964

<u>Country</u>	<u>1963</u>		<u>1964</u>		<u>\$/lb.</u>
	<u>'000 lb.</u>	<u>\$'000</u>	<u>'000 lb.</u>	<u>\$'000</u>	
United Kingdom	36.0	9.1	3.7	1.5	0.40
Japan	-	-	11.1	3.3	0.30
Netherlands	194.8	70.3	-	-	-
Switzerland	1.1	0.6	89.1	57.7	0.65
U.S.A.	<u>5,812.7</u>	<u>2,150.7</u>	<u>4,553.6</u>	<u>1,574.5</u>	<u>0.35</u>
TOTAL	6,044.6	2,230.7	4,657.5	1,637.0	0.35

Source: D.B.S., Trade of Canada, Cat. No. 65-007

Imports of these resins were said to be "made up principally of moulding compounds and impregnating resins" and it was indicated at the hearing in 1963 that imports would probably experience a considerable reduction when Cyanamid of Canada's plant for the manufacture of moulding compounds come into operation.⁽¹⁾ The drop in imports which took place in 1963 and 1964 would appear to bear out this observation.

In regard to exports, one company spokesman indicated that there has been no appreciable export of melamine-formaldehyde and that there is a pretty high tariff wall in the U.S.A. to get over.

Prices and Pricing Policy

Published prices on melamine-formaldehyde resins are not available in Canada. U.S. prices, for the last four years have remained at 43 to 45 cents per pound for the adhesive grade and at 38 to 40 cents per pound for laminating powder.⁽²⁾ According to an exhibit made available to the Board, prices of melamine-formaldehyde cellulose-filled moulding compounds, powder form, to Canadian customers, on shipments of 10,000 pounds and over, were equal to the corresponding U.S. prices plus the 8 per cent rate of exchange. Depending upon the size of purchases, the prices varied from \$0.486 per pound for shipments of 10,000 pounds and over, to \$0.81 per pound when the purchase was less than the standard container of 200 pounds.

(1) Transcript, Vol. 125, p. 18679

(2) Chemical & Engineering News, various issues

Tariff Considerations

Amino-aldehyde type resins, including urea-formaldehyde and melamine-formaldehyde, are generally imported under the following items:

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
901(a) Synthetic resins without admixture, including scrap or waste: 2. Amino-aldehyde type	Free	Free
(b) Synthetic resins in the form of aqueous emulsions, aqueous dispersions or aqueous solutions, without admixture: 2. Amino-aldehyde type	Free	Free
(c) Synthetic resins in organic solvents where the solvent is not more than 60 per cent by weight, without other admixture: 2. Amino-aldehyde type	12½ p.c.	12½ p.c.
(d) Synthetic resins, in powder or granular form, containing an ingredient to prevent caking in shipment, not in excess of 3 per cent by weight, but without further admixture: 1. Amino-aldehyde type	Free	Free
902 Synthetic resins, compounded with other materials, in any form, including scrap or waste, for moulding, casting, extruding, calendering, pressing, (moulding compositions or materials for processing into moulding compositions); synthetic resins compounded with other materials in the form of not fully cured preforms or not fully cured blanks for compression mouldings:		
(f) Other type	Free	Free
903 Synthetic resin glues or adhesives, composed of synthetic resins compounded with other materials	15 p.c.	17½ p.c.
904 Synthetic resin compositions, n.o.p.	15 p.c.	15 p.c.

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
905	Synthetic resin plates, sheets, film, sheeting or strips, not less than 6 inches in width, n.o.p.; synthetic resin lay-flat tubing, not less than 6 inches in circumference, n.o.p.:-	
(f)	Other type:	
	1. Plain, uncoated, undecorated	Free
	2. Other	10 p.c.
906	Synthetic resin plates, sheets, film, sheeting or strips, less than 6 inches in width, lay-flat tubing less than 6 inches in circumference, other tubing, blocks, bars, rods, non-textile monofilament; synthetic resin profile shapes produced in uniform cross-section and imported in lengths: not further manufactured than moulded, cast, calendered, extruded or pressed, n.o.p.:-	
(e)	Other type	15 p.c.
916	Laminated moulded plastics products, n.o.p., having synthetic resins or cellulose plastics as the chief bonding (impregnating) agents	
		15 p.c.
917	Reinforced or supported synthetic resin or cellulose plastics plates, sheets, sheeting, strips, tubing, blocks, bars, rods, in which is incorporated a layer of paper, fibreboard, or textile fabric, or a core of fibres whether matted or otherwise arranged, n.o.p.:-	
(b)	Other	15 p.c.

With the exception of submissions considered to be of a general nature and dealt with in the introductory part of this chapter, there were fourteen submissions on amino-aldehyde type resins. Canadian Paint Varnish and Lacquer Association (CPVLA), on behalf of Canadian paint companies engaged in the manufacture of resins and emulsions for captive use, agreed with the proposal recorded by the Industry Committee that urea-formaldehyde resins and melamine-formaldehyde resins, now entered under item 901(c)2, be classified under an item like B.T.N. heading 39.01, dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N.(1) Five other producers also recommended an

(1) Transcript, Vol. 130, p. 19422

increase in the rates of duty. Reichhold Chemicals (Canada) Limited, a manufacturer of resins falling under items 901(b)2 and 901(c)2, was in "substantial agreement" with the rates recorded by the Industry Committee, 15 p.c., B.P. and 20 p.c., M.F.N., for amino-aldehyde type resins under B.T.N. 39.01. Cyanamid of Canada Limited, a manufacturer of urea- and melamine-formaldehyde resins, compounds and laminates, requested that rates of 15 p.c., B.P. and 20 p.c., M.F.N. be applied to an item like B.T.N. heading 39.01. The recommended rates were said to be for all the products under 39.01 because, in the company's view, there is some competitive substitution among them. Monsanto Canada Limited proposed that amino-aldehyde resins be classified under an item like B.T.N. 39.01 and be dutiable at 15 p.c., B.P. and 20 p.c., M.F.N. The company reported that it does not produce moulding resins and compounds and therefore was not making recommendations regarding these products. Borden Chemical Company of Canada supported the proposals of Monsanto Canada Limited and Cyanamid of Canada Limited. Hercules Powder Company (Canada) Limited, a producer of cationic urea-formaldehyde, recommended that rates of 15 p.c., B.P. and 20 p.c., M.F.N. be applied to products of tariff items 901(a)2, 901(b)2 and 901(d)1.(1)

Among the consumers, those in the plywood industry were opposed to any increase in duties, particularly on urea-formaldehyde resins. Abitibi Power and Paper Company, Limited indicated its opposition to the imposition of duty on urea-formaldehyde resin as did Jamar Flakeboard Limited, Rexwood Products Limited and the Poplar Plywood Association.(2) The Plywood Manufacturers Association of British Columbia made representation on behalf of the following eleven companies:

British Columbia Forest Products Limited
 Canadian Collieries Resources Limited
 Canadian Forest Products Limited
 Crown Zellerbach Building Materials Limited
 Douglas Plywood Limited
 Evans Products Company Limited
 MacMillan, Bloedel & Powell River Limited
 Richmond Plywood Corporation Limited
 S.M. Simpson Company Limited
 Victoria Plywood Limited
 Western Plywood Company Limited

It requested that "the free entry now granted to tariff items 901(b)2 and 901(d)1 be continued"; The Canadian Lumberman's Association supported the proposal.(3)

The Canadian Pulp and Paper Association, in a general submission, opposed any increases in rates of duty on chemicals used by the pulp and paper industry. The Association mentioned melamine and urea resins as materials used.(4)

(1) Transcript, Vols. 125 and 126

(2) Same, Vol. 128, p. 19187; Vol. 129, p. 19351-5

(3) Same, Vol. 129, p. 19268, 19349

(4) Same, Vol. 36, p. 5246, 5253

Other consumers were mostly concerned with moulding compounds. A submission was made by:

Armstrong Cork Canada Limited, Montreal, Quebec
 Bach-Simpson Limited, London, Ontario
 Bech Electric Mfg. Co. Limited, Toronto, Ontario
 H.B. Etlin Co. Limited, Weston, Ontario
 Klockner-Moeller Canada Limited, Granby, Quebec
 Leviton Mfg. of Canada Limited, Montreal, Quebec
 Mitchell Plastics & Buttons Limited, Kitchener, Ontario
 Plastomer Limited, Barrie, Ontario
 Thermoset Plastics (Guelph) Limited, Guelph, Ontario

The companies proposed free entry under the Most-Favoured-Nation Tariff for urea-formaldehyde moulding compounds. In addition, Thermoset Plastics (Guelph) Limited made a separate submission and proposed free entry on "urea materials" which would refer to urea-formaldehyde moulding compounds.⁽¹⁾ Canadian Buttons Limited requested that the present duty-free entry of melamine-formaldehyde and urea-formaldehyde moulding powders, used in the compression moulding of buttons, remain unchanged because, at the time of the hearing, these materials were not available from domestic sources.⁽²⁾

The British Plastics Federation requested that moulding compounds be separated from resins under a heading as follows:⁽³⁾

"Moulding compounds - Amino Aldehyde Type" - Free, B.P.

The British Plastics Federation made this recommendation on the assumption that compounds were not made in Canada; the spokesman for Cyanamid indicated his company planned to begin production of both melamine-formaldehyde and urea-formaldehyde moulding compounds in 1963.

Arguments in Support of Proposals

In support of their proposals, the manufacturers of urea-formaldehyde and melamine-formaldehyde resins presented a number of views. It was pointed out by the CPVLA that manufacture of urea-formaldehyde and melamine-formaldehyde resins for captive use by the paint industry represented a saving to that industry and provided flexibility in manufacture. To encourage the manufacture of the resins, the Association supported the proposed rates of 15 p.c., B.P., 20 p.c., M.F.N.⁽⁴⁾ Among the merchant producers, Cyanamid took the position that with completion of the manufacturing facilities in progress at the time of the hearings, Canadian installed capacity would be able to satisfy the expanding Canadian market, and the company expressed the opinion that the 15 p.c., B.P. and 20 p.c.,

(1) Transcript, Vol. 127, p. 19051, 19064

(2) Same, Vol. 161, p. 23971

(3) Same, Vol. 123, p. 18476

(4) Same, Vol. 130, p. 19423

M.F.N. rates "as applied to chemicals made in Canada at present has ... assisted in the establishment of a number of manufacturing facilities."⁽¹⁾ In the view of Hercules Powder, the free entry of amino-aldehyde type resins was detrimental to their production besides being a "detriment to any future plant expansion." The company added:

"The total business is expanding and will continue to expand with the successful developments in the wet strength field. If protection in the form of duty is not provided, this would invite importation of competitive products to the detriment of existing production facilities which are ample to meet Canadian requirements for some years to come."⁽²⁾

Monsanto estimated that resins produced by Canadian manufacturers could satisfy more than 95 per cent of domestic requirements, as compared with about 77 per cent in 1961. A tariff, it was said, "at the rates recommended would provide this additional market to producers and reduce the threat of further loss of market as prices continued to fall ..."⁽³⁾ It was also stated that tariff protection was required "to prevent further reduction of prices to levels which would eliminate the incentive to carry out the research and development to provide the products required by the Canadian market and endanger continued manufacture in Canada."⁽⁴⁾ Reichhold Chemicals thought that the increase of duty rates was essential to the growth in production of the resins and that it would also provide the necessary incentive to encourage consumers of imported resins to evaluate materials made in Canada.⁽⁵⁾

The producers of plywood and panel board, such as Abitibi Power & Paper, Jamar Flakeboard, Rexwood Products and Poplar Plywood Association, were opposed to any increase in duty rates on urea-formaldehyde resins on the grounds that urea-formaldehyde resin is a major raw material for their industry, particularly in the manufacture of particle board where it represents over half the material cost⁽⁶⁾; any increase in rates of duty would expose them to an increase in production costs.⁽⁷⁾ The industry, it was said, is already in a difficult period of strenuous competition and any action resulting in higher priced adhesive would reduce consumption generally and restrict sales in the export market. The spokesman for the Plywood Manufacturers Association of British Columbia pointed out that urea-formaldehyde and melamine formaldehyde adhesives were also used in the manufacture of plywood in British Columbia and that "artificial and unnecessary increases" of tariff rates on the resins or on their raw materials would invite retaliation by other countries and might impair the industry's ability to maintain its share in the domestic as well as in the export market.

(1) Transcript, Vol. 126, p. 18786

(2) Same, Vol. 126, p. 18832

(3) Same, Vol. 125, p. 18681

(4) Same, Vol. 125, p. 18681

(5) Same, Vol. 126, p. 18862

(6) Same, Vol. 129, p. 19353

(7) Same, Vol. 128, p. 19188

Another sector of consumers, the moulders, was principally concerned with compounds. The companies based their request for duty-free entry for the complete range of urea compounds on the fact that, at the time of the public hearing, the products or grades of products of interest to them were not being produced in Canada. It was stated that with duty-free entry "Canadian moulders and consumers will continue to benefit greatly, since the urea compounds will be available to Canadians at substantially the same cost as they are available to foreign moulders"(1) and further that:

"in the event an increase in present tariffs of moulding materials is considered, then the tariffs of finished mouldings must be raised simultaneously. Otherwise, such a move, apart from increasing imports of finished mouldings, would place the Canadian moulder, in his efforts to compete against imports, at the complete mercy of the domestic material manufacturer."(2)

Canadian Buttons Limited stated in its submission that the market requirements of buttons were much smaller in Canada than either in the U.S.A. or in the overseas markets, and the imposition of a tariff on resins would, the company said, "make our competitive position even more precarious than it is already now compared to low cost producers such as Japan, Hong Kong and Italy."(3)

The British Plastics Federation, in support of continuance of duty-free entry of aminoplasts under the British Preferential Tariff stated:

"the Canadian plastics industry has nothing to fear from the British plastics industry in direct competition on the home market and whereas the Canadian industry had great advantage of nil tariffs when exporting to the United Kingdom in competition with the world's other major plastics material producing nations, i.e., United States of America, Western Germany and Japan, the United Kingdom industry has to overcome in some cases very high tariffs as well as high transport costs when competing in Canada with the United States plastics industry.(4)

(1) Transcript, Vol. 127, p. 19062

(2) Same, Vol. 127, p. 19049

(3) Same, Vol. 161, p. 23970

(4) Same, Vol. 123, p. 18475

Analysis of Proposals

It will have been noted that the production and marketing of phenoplasts and aminoplasts are essentially similar in nature; both resins find their major use in the plywood and panel board industry of British Columbia and Eastern Canada. There are, however, some differences in the tariff rates that apply to these resins. Phenol resins are duty-free when imported for use by the plywood industry (item 925) and dutiable at $7\frac{1}{2}$ p.c., under both the B.P. and M.F.N. Tariffs, when imported for other uses, including hardboard. Amino-type resins, on the other hand, are duty-free for all uses including plywood and chipboard.

Many of the arguments put forward both by the producers and the users of the aminoplasts were similar to those noted previously for the phenoplasts. While the producers have a very large part of the domestic market, they are anxious to have tariff protection to help them secure the remainder and to help them retain what they have. However, they did not claim any major disabilities in competition with imported products and suggested that prices in Canada frequently were as low as, or lower than, those of the imported products.

The users, on the other hand, expressed the general fear that higher rates of duty would induce higher costs of materials; for some moulders and fabricators there was expressed the further fear that the domestic suppliers might not be able to supply all of the grades required and that any increase in the cost of materials would place their finished products at a competitive disadvantage.

Neither the producers nor the users demonstrated specifically the extent to which any change in the rates of duty would affect their fortunes. Very little comment was made on the usefulness of the existing, detailed breakdown in the Customs Tariff for resins by stage of processing, though the fairly general agreement for an item worded like B.T.N. heading 39.01, without further subdivision, would imply the deletion of separate provision for different forms of materials except for the fabricated products provided for by heading 39.07 or by other items of the Customs Tariff. No evidence was advanced by the producers as to why rates of 15 p.c., B.P., 20 p.c., M.F.N. were appropriate specifically for the aminoplasts and, in particular, why the proposed British Preferential rate of 15 p.c., was necessary. These were, however, the rates proposed generally by the industry.

ALKYD RESINS

These resins are condensation products of polyhydric alcohols with polybasic organic acids. They are usually produced by reacting a drying oil (such as soya bean oil) with a dibasic acid (such as phthalic anhydride) and a polyhydric alcohol (such as glycerol or pentaerythritol). Modification is accomplished by the use of other vegetable oils, fatty acids, rosin, rosin derivatives, styrene or other substances.

The largest portion of alkyd resins in Canada is supplied in solution forms, in an organic solvent with a non-volatile (solids) content of about 40 and 70 per cent.⁽¹⁾

Alkyd resins find their principal use as protective coverings for wood, metal and similar materials where they provide high gloss, good adhesion and good resistance to electricity, heat and chemicals. They are widely used in the manufacture of parts of automobile starters, fuses, light switches, electric motor insulators and mounting cases, television tuning devices and tube supports and in similar products. Small amounts are used for making printing inks, as plasticizers in the manufacture of other resins and for a range of miscellaneous uses.

A batch process, employing kettles of up to 5,000 Imperial gallons capacity, is used in the manufacturing operation in Canada. To a great extent, the plant output of any one product varies according to the batch schedule. By and large, the plants are operated five or six times a week on a 24-hour schedule; they can be operated on a 7-day week basis to give, in effect, an increase in capacity.

The Industry

Canadian production of alkyd resins for sale was begun in the 1930's by Canadian General Electric at its plant in Toronto, Ontario. By the end of World War II, Polyresins Limited had entered the field of alkyds and these two companies were joined by a number of others in the 1950's. At the time of the public hearing in 1963, it was reported that there were at least six resin manufacturers producing for sale⁽²⁾; except for the Port Moody facilities of Reichhold Chemicals (Canada) Ltd., all of their plants were located in the Toronto area. They were selling resins, almost entirely in organic solvents, for use in the paint industry.

(1) Transcript, Vol. 130, p. 19388

(2) Same, Vol. 130, p. 19389

Merchant Producers of Alkyd Resins

<u>Company</u>	<u>Plant Location</u>
Archer-Daniels Midland Company (Canada) Limited	Toronto, Ont.
Canadian General Electric Company Limited	Toronto, Ont.
Polyresins Limited	Toronto, Ont.
Reichhold Chemicals (Canada) Limited	Weston, Ont.
	Port Moody, B.C.
Rohm & Haas Company of Canada Limited	West Hill, Ont.
Schenectady Varnish Canada Limited	Scarborough, Ont.

Source: D.B.S., Chemical Directory, Cat. No. 46-502; Transcript, Vol. 130, p. 19390

In addition to the above companies, the paint manufacturers have developed their alkyd resin production along the same lines as the merchant producers; Canadian Industries Limited started production at about the same time as Canadian General Electric. By 1963, about twelve large to medium-size paint companies were engaged in making their own resins. These included the major paint manufacturers such as C.I.L., the Glidden Company Limited, Sherwin-Williams Company of Canada, Limited, Imperial Flo-Glaze Paints Limited (now owned by Du Pont of Canada Limited) and Alma Paint & Varnish Company, Limited.⁽¹⁾

The major raw materials for the manufacture of alkyd resins, phthalic anhydride, soya bean oil, pentaerythritol and glycerin are largely obtained from Canadian sources. However, depending upon the price, these materials are also supplied by imports from Europe and Japan. One producer indicated that, generally speaking, his company preferred to buy Canadian raw materials because deliveries were better and the company could keep smaller inventories.

Total Canadian capacity to manufacture alkyd resins is considered to be flexible since the same facilities are often used for making various other types of resins and, moreover, may be readily expanded according to requirements. The resin manufacturers indicated in their submissions that production capacity in Canada was in excess of domestic requirements, although one spokesman described the situation as one of "ample" rather than "over" capacity. Reference was made to the fact that the equipment is not highly "capitalized" in the sense that the manufacturing operation can be carried out quite efficiently in relatively small batch units when compared to the chemical industry in general.

The cost of materials entering into the manufacture of alkyds appears to account for about 70 to 90 per cent of the manufactured resin cost.⁽²⁾ Canadian costs of manufacture were said to be higher than in some other countries because of shorter runs as compared, for example, to those in the U.S.A. Because of their much larger market, U.S. firms may employ kettles having 3 to 5 times the capacity of a

⁽¹⁾ Transcript, Vol. 130, p. 19390

⁽²⁾ Same, Vol. 126, p. 18873

producer in Canada with consequent gains in uniformity of product and lower costs. It was also suggested that a U.S. company could fill a tank-car with one batch while the Canadian company might require several batches to make up a car for shipments.

The growth of the alkyd resin industry has been marked by the entry of a relatively few companies into the manufacture of resins for sale. On the other hand, the number of paint companies manufacturing alkyds for their own use has more than doubled since the 1950's. Captive production, the Board was told, offered financial savings as well as greater flexibility with respect to manufacture, formulation and supply.⁽¹⁾ As alkyd resins in Canada are nearly all used in the manufacture of a variety of surface coatings, future growth of the industry is likely to be highly dependent upon the developments in the paint field.

Alkyd resin moulding compounds are not made in Canada and are used only to a limited extent mainly in the manufacture of ignition parts and general electrical insulation components.

The Market

Because of the large amount of captive use, precise data on total Canadian consumption of alkyd resins are not available. The publication, Canadian Plastics, contained estimates of consumption, exclusive of captive use, as follows:

The Market for Alkyd Resins, 1957-64

	<u>Commercial Production</u>	<u>Imports</u> '000 lb., liquid or powder	<u>Exports</u> small	<u>Commercial Consumption</u>
1957	16,850	8,150	small	25,000
1958	17,000	9,000	"	26,000
1959	18,500	7,500	"	26,000
1960	19,000	8,000	"	27,000
1961	19,500	7,500	"	27,000
1962	21,000	7,500	"	28,500
1963	21,000	7,000	"	28,000
1964	21,000	6,500	"	27,500

Source: Canadian Plastics (various issues)

Consumption figures include small amounts of alkyd moulding powder reported, in 1962, to be about 200,000 pounds per year.

The apparent stability of the market for alkyds does not reveal the expansion in total use which has resulted from production by the paint companies for own use. When this is taken into account,

⁽¹⁾ Transcript, Vol. 130, p. 19423

Canadian production has assumed increasing importance relative to imports. Estimates given before the Board were that the paint industry consumes something in the order of 60 to 65 million pounds, solids basis.⁽¹⁾ Such a quantity would have a value of about \$15 million. Less than 50 per cent of total Canadian consumption apparently is supplied by merchant producers and by imports; more than half is supplied by the paint companies producing for their own use.

In general, the market was described as being "energetically" and "fearfully" competitive because of the small margins between costs and selling prices.⁽²⁾

Factory shipments of alkyd resins as reported by the D.B.S. were valued at nearly \$7 million in 1962 and \$8.5 million in 1963. However, these data undoubtedly include some inter-plant shipments by the paint companies.

Factory Shipments and Consumption of Alkyd Resins, 1957-63

	<u>Factory Shipments</u> \$'000	<u>Purchases by the</u> <u>Paint Industry</u> \$'000
1957	5,136	5,487
1958	5,199	5,693
1959	5,282	5,837
1960	5,294	6,086
1961	6,370	6,003
1962	6,868	6,198
1963	8,508	6,550

Source: D.B.S., Cat. Nos. 46-210 and 46-211

In marketing alkyd resins, it was indicated at the public hearing that very little, if any, is sold in Canada without solvent. Occasionally a paint company located at considerable distance from a supplier might purchase the solid because transportation charges would render the inclusion of the solvent uneconomic, but the easiest and most economical method is to introduce the solvent in the resin kettle. The material is shipped in tank-wagons or drums. To maintain the appropriate viscosity for pumping to and from the tank-wagon, the material is shipped in a heated condition.

The Canadian Paint Varnish & Lacquer Association, in its submission, stated that the form in which purchased alkyd resins were consumed varied from 40 per cent solids to 90 per cent and over. The largest portion, about 8.7 million pounds, was 50 per cent solids, followed by 4 million pounds as 70 per cent solids and 3.7 million pounds as 40 per cent solids. There were also about one-half million pounds in the form of 90 per cent solids and over, with minor amounts

(1) Transcript, Vol. 129, p. 19375; Vol. 130, p. 19425

(2) Same, Vol. 130, p. 19420

of modified alkyds such as phenol-formaldehyde, urea-formaldehyde, vinyl and natural resin modified alkyds. Other alkyds, including 60 per cent solids, amounted to about 3.9 million pounds.⁽¹⁾

Nearly all imports of alkyd resins come from the U.S.A. and it was reported that, although their price was at times higher than the Canadian product, they continued to be imported because "they are specified in formulations which may have been introduced to the Canadian plant."⁽²⁾

D.B.S. import statistics combine alkyd and allyl resins in one statistical class and are available only since 1962.

Imports of Polyester Resins (Alkyd & Allyl),
1962-64

<u>Year</u>	<u>'000 lb.</u>	<u>\$'000</u>	<u>\$/lb.</u>
1962	6,966	2,550	.37
1963	7,057	2,486	.35
1964	7,991	2,821	.35

Source: D.B.S., Trade of Canada, Imports

Of the above imports, in 1964, \$2.5 million were dutiable; the average of the rates of duty paid was 8.1 per cent.

U.S. exports data are available for a longer period and are given below.

U.S. Exports of Alkyd Resins to Canada, 1958-64

<u>Year</u>	<u>'000 lb.</u>	<u>U.S. \$'000</u>	<u>Unit Value</u> <u>U.S. \$/lb.</u>
1958	7,665	2,228	.29
1959	8,772	2,538	.29
1960	7,562	2,282	.30
1961	7,610	2,347	.31
1962	8,011	2,688	.34
1963	7,883	2,252	.29
1964	9,476	2,786	.29

Source: U.S. Department of Commerce, Bureau of Census, U.S. Exports

⁽¹⁾ Transcript, Vol. 93, p. 14182

⁽²⁾ Same, Vol. 130, p. 19391

By the U.S. export data, imports averaged about 7.9 million pounds in the six years prior to 1964, valued at U.S. \$2.4 million. The average value, in 1964, was \$U.S. 0.29 per pound.

Pricing Policy and Prices

Prices in Canada were said to be generally comparable to those in the U.S.A., although on occasion they were somewhat lower. According to Canadian producers, the domestic market was so highly competitive that import prices have not been a major factor in determining the Canadian pricing system. The Board was informed that in the case of alkyd resins any increase in raw material cost would be passed on to the customer, and that, therefore, the price of the alkyd resins as sold to the paint industry would depend on the fluctuations in the raw materials. It was added that the paint industry was aware of these facts and if, for example, the price of soya bean oil was increased, this increase would be reflected in the price of the resin.

The Board was informed that "Most raw materials used in the manufacture of alkyds enter Canada duty-free resulting in a raw material cost structure which enables the industry to be competitive with imports under the present tariff structure." (1)

Published prices in Canada are not available. However, the average value of purchased alkyd resins consumed by the paint industry was in the range of 18.9 cents to 23.6 cents per pound in 1962. Depending upon the solids content, the U.S. price quotations for alkyd resin solutions in truck-load quantities were between 18.5 cents and 36.25 cents per pound.

U.S. Prices of Alkyd Resins Alkyd resin solutions, Truckload U.S. \$ per lb.

1961	.18 - .29 $\frac{3}{4}$
1963	.18 $\frac{1}{2}$ - .36 $\frac{1}{4}$
1964	.18 $\frac{1}{2}$ - .36 $\frac{1}{4}$

Source: Chemical and Engineering News (various issues)

Alkyd moulding compounds are not, as yet, the object of any considerable trade. For Customs purposes, the materials are considered to be not made in Canada; domestic requirements are supplied from imports.

Tariff Considerations

In the present Tariff, alkyds are included under the classification for polyesters and are entered mainly under the following items:

(1) Transcript, Vol. 130, p. 19388

Item	British Preferential Tariff	Most- Favoured- Nation Tariff
901(a) Synthetic resins without admixture, including scrap or waste: 3. Polyester type	5 p.c.	5 p.c.
(b) Synthetic resins in the form of aqueous emulsions, aqueous dis- persions or aqueous solutions, without admixture: 3. Polyester type	5 p.c.	5 p.c.
(c) Synthetic resins in organic solvents where the solvent is not more than 60 per cent by weight, without other admixture: 3. Polyester type	12½ p.c.	12½ p.c.
902 Synthetic resins, compounded with other materials, in any form, including scrap or waste, for moulding, casting, extruding, calendering, pressing, (moulding compositions or materials for pro- cessing into moulding composition); synthetic resins compounded with other materials in the form of not fully cured preforms or not fully cured blanks for compression mould- ings:-		
(b) Polyester type	5 p.c.	5 p.c.
904 Synthetic resin compositions, n.o.p.	15 p.c.	15 p.c.
905 Synthetic resin plates, sheets, film, sheeting or strips, not less than 6 inches in width, n.o.p.; synthetic resin lay-flat tubing, not less than 6 inches in circumference, n.o.p.:-		
(f) Other type:		
1. Plain, uncoated, undecorated	Free	Free
2. Other	10 p.c.	10 p.c.
906 Synthetic resin plates, sheets, film, sheeting or strips, less than 6 inches in width, lay-flat tubing less than 6 inches in circumference, other tubing, blocks, bars, rods, non-textile mono- filament; synthetic resin profile shapes produced in uniform cross-section and imported in lengths: not further manufactured than moulded, cast, calen- dered, extruded or pressed, n.o.p.:-		
(e) Other type	15 p.c.	15 p.c.

There were eight submissions, excluding those of a general nature, concerning alkyd resins. Five submissions by producers, including the Canadian Paint Varnish and Lacquer Association on behalf of the Canadian paint companies which make these resins for captive use, all recommended an increase in the rates of duty. The proposed rates were 15 p.c., B.P., 20 p.c., M.F.N. The five submissions that supported these rates were by the Canadian General Electric Company Limited, The Canadian Paint Varnish and Lacquer Association, Polyresins Limited, Reichhold Chemicals (Canada) Limited and Schenectady Varnish Canada Limited.⁽¹⁾ These submissions, in general, supported the Industry Committee's proposal for the adoption of the Brussels Nomenclature for resins and plastics with uniform tariff rates of 15 p.c., B.P. and 20 p.c., M.F.N. for products classified under the B.T.N. heading 39.01. Schenectady Varnish also recommended cancellation of the "not-made-in-Canada" status if identical products, "or if products satisfactory for substitution over a substantial area of consumption of imports" are made in Canada; the company also proposed elimination of "end-use" items.⁽²⁾ This submission is also referred to with respect to alkali-soluble resins in the section on "Other Resins of Heading 39.01."

For classification purposes, some alkyd resins modified with rosin, oils or fatty acids, such as those derived from tall oil, would fall under heading 39.01. Harrisons and Crosfield (Canada) Limited submitted a proposal on a large number of resins designated by trade names. The company proposed continuation of free entry for these, some of which were said to be rosin-derived alkyd-type resins now entered duty-free under tariff item 901(a)7. They were regarded by the company as specialty products not made in Canada and not likely to be made. When they contain solvent, the products are dutiable under item 901(c)4, and Harrisons and Crosfield proposed that this item should continue to apply with the present duty of $12\frac{1}{2}$ p.c., under both the B.P. and M.F.N. Tariffs.⁽³⁾

Minnesota Mining and Manufacturing of Canada Limited, in its general submission, made reference to an alkyd film, coated with adhesive, known as "SCOTCHCAL", and a retro-reflective alkyd plastic film, coated with adhesive, known as "SCHOTCHLITE", both used for making commercial emblems, traffic sign faces or other markings. The company requested duty-free entry for these products until they are made in Canada, at which time the rates would become 15 p.c., B.P. and 20 p.c., M.F.N.⁽⁴⁾

Arguments in Support of Tariff Proposals

The manufacturers of alkyd resins, in support of the proposed increased rates of duty, took the position that excess capacity and the small size of the Canadian market compared, for example, to that in the U.S.A. resulted in higher unit costs for Canadian producers, particularly in terms of basic manufacturing costs, product development and technical service costs.⁽⁵⁾ Their principal concern, however, centred

⁽¹⁾ Transcript, Vols. 126, 127, 129 and 130

⁽²⁾ Same, Vol. 127, p. 18930

⁽³⁾ Same, Vol. 161, p. 23880

⁽⁴⁾ Same, Vol. 162, p. 24096

⁽⁵⁾ Same, Vol. 129, p. 19362

around the proposed rates on raw materials, some of which at present enter duty-free under items 921 and 923; others, such as soybean oil and tall oil, are admitted duty-free for use in the manufacture of resins for paints and varnishes.

One manufacturer stated that:

"Most raw materials used in the manufacture of alkyds enter Canada duty-free resulting in a raw material cost structure which enables the industry to be competitive with imports under the present tariff structure. If, however, tariffs are imposed on raw materials such as phthalic anhydride and soya bean oil, then costs could increase to the point that under present tariff conditions, Canadian producers would no longer be competitive with U.S. manufacturers whose production costs are lower than ours."(1)

It was also said that in the case of alkyd resins, raw material costs amount to 70 per cent or more of the selling price. It was, therefore, proposed that in establishing rates on alkyd resins and their raw materials, "in no case should the duty allowed on the raw materials be higher than that allowed on the finished product."(2)

Schenectady Varnish Canada Ltd. explained that its production was highly diversified in order to supply specialty products and that the company was faced with relatively small markets for each product compared, for instance, to phenolic resin adhesives for the plywood industry.

Harrisons & Crosfield's main concern was items 901(a)7 and 901(c)4 which classify and describe the products of interest to the company. It was stated that none of these products is made in Canada and in the event that any become "ruled as made in Canada it is understood that these recommendations will be reconsidered."(3)

Attention was drawn to the fact that, in the B.T.N. classification, alkyd resins in organic solvents without other admixture fall under heading 39.01 when the weight of the solvent does not exceed 50 per cent of the weight of the solution. When the weight of the solvent is greater than 50 per cent, the products are classified with paints and varnishes under B.T.N. 32.09. In the Canadian Customs Tariff the demarcation is 60 per cent solvent by weight. Above 60 per cent, the products are classified under tariff item 904, as other compositions; most relevant products with not more than 60 per cent solvent are dutiable under tariff item 901(c)3.

In general, therefore, the manufacturers of alkyd resins took the view that rates of 15 p.c., B.P., 20 p.c., M.F.N. were appropriate for these products even though import competition had not been increasing in recent years and imports, or the availability of goods abroad, was not regarded as a major factor affecting prices in Canada. Because material costs represent a high percentage of total costs of production, the concern of the producers was very largely that higher rates of duty

(1) Transcript, Vol. 130, p. 19388

(2) Same, Vol. 129, p. 19363

(3) Same, Vol. 161, p. 23881

on materials might make the Canadian manufacture of alkyd resins less competitive, and that the proposed rates were intended to preserve the competitive position. No reasons were given as to why the proposed rates were specifically appropriate for alkyd resins except that these were the rates generally proposed for chemicals, including important raw materials to the industry. In particular, no specific reasons were advanced for the rate of 15 p.c. under the British Preferential Tariff. Under the proposals, the differences that exist in the rates of duty for alkyd resins in various forms would disappear in favour of the proposed uniform rates and classification under an item worded like B.T.N. heading 39.01.

No consumers opposed the proposals, except that some of the general submissions dealt with in the introductory part of this chapter urged that the rates of duty on resins not be increased.

No special difficulties were brought to the attention of the Board concerning the classification of the various forms of alkyd resins and compounds under an item worded like B.T.N. heading 39.01. It is understood that most of the forms of resin provided for in the items enumerated above would qualify for entry under such an item, though some conceivably would be classified as further manufactured goods under heading 39.07, or be dutiable under other items in the Customs Tariff. This situation is discussed more generally in the introductory section to this chapter. Difficulties were brought to the attention of the Board in trying to distinguish between certain types of resins which might be regarded as made in Canada and types not made; these were fairly generally the same as the difficulties encountered over the broad range of chemical products.

UNSATURATED POLYESTERS

In its broader sense, the term polyester embraces a wide range of synthetic resins, including the alkyds as well as other resins referred to as unsaturated polyesters and others referred to as saturated polyesters. The alkyds may be described as oil-modified polyesters; unsaturated polyesters are sometimes called oil-free alkyds. The saturated polyesters are referred to as linear polyesters and polyurethanes. The alkyds have been discussed in the preceding section; the other unsaturated polyesters are popularly known simply as polyesters, and are so referred to in this part of the report. The saturated polyesters are dealt with in a subsequent section on linear polyesters.

Unsaturated polyester resins are produced from dibasic acids, dihydric alcohols and unsaturated hydrocarbons such as styrene. The range of these polymers is large, and most of them display such valuable qualities as strength, toughness, superior chemical resistance, high dielectric properties, low water absorption, and the ability to cure at low temperatures and pressures. They are available in liquid, powder or semi-solid resin form and as cast sheets, rods and tubes.

The manufacturing process for unsaturated polyester resins is essentially the same as that employed for the alkyds. The resins are thermosetting and their principal application is as a "binder" in

reinforced plastics. Combined with reinforcing materials such as glass, asbestos, sisal, nylon and other fibres they are used in the manufacture of a wide range of reinforced plastic products including boats, tanks, furniture, decorative panels and sheeting, automobile heating ducts and fenders. Polyesters are also used in the preparation of automobile patching compounds and in the manufacture of corrosion resistant pipes and ducts, bricks and block coatings, wood finishes and in a variety of other uses.

The Industry

The production of unsaturated polyesters in Canada was initiated by Naugatuck Chemicals Division of Dominion Rubber Company at its plant at Elmira, Ontario, in 1950. Canadian General Electric Company became the second producer of these resins at Toronto, Ontario in 1953. Three years later, Reichhold Chemicals' plant at Weston, Ontario came into production and since that time a number of other companies have entered the industry including some paint companies which use their alkyd resins facilities to make these other polyesters, largely for sale to the manufacturers of reinforced plastic products. Unlike the users of alkyds, the users of other unsaturated polyesters have not become manufacturers of the product in Canada.

In 1964, the principal producers were:

<u>Company</u>	<u>Plant Location</u>
British American Paint Company Limited	Victoria, B.C.
Canadian General Electric Company Limited	Toronto, Ont.
Canadian Pittsburgh Industries Limited	Toronto, Ont.
Chemical Oil & Resin Company	Toronto, Ont.
The Glidden Company Limited	Toronto, Ont.
Naugatuck Chemicals, Division of Dominion Rubber Company	Elmira, Ont.
Reichhold Chemicals of Canada Limited	Weston, Ont.
	Port Moody, B.C.

Source: Transcript, Vol. 129, p. 19369; D.B.S. Chemical Directory, Cat. No. 46-502

Raw materials were said to constitute from 50 to 70 per cent of the selling price of the finished product; most of the raw materials are obtained from domestic producers.

Production capacity figures for these plants were not disclosed; as with alkyd resins, the capacity of a plant will vary according to the production schedule for the various resins. Generally, most producers considered that excess capacity existed and one of them estimated capacity to be at least double Canadian consumption.⁽¹⁾

⁽¹⁾ Transcript, Vol. 130, p. 19465, 19467

The substantial growth of the polyester industry in Canada is reflected in production figures which rose from an estimated 2.5 million pounds in 1957 to over 9 million pounds in 1964.⁽¹⁾ The number of principal producers has grown from one in 1951 to seven in 1964 and, in addition, perhaps an equal number of small-scale manufacturers are also in operation.

The Market

In 1964, consumption was estimated at 11.7 million pounds.⁽²⁾ As demand in 1957 was only 3.2 million pounds, consumption in the eight year period more than tripled, a degree of expansion which has been brought about in particular by the increased use of reinforced plastics for boat building and for interior and exterior applications in the construction industry. Larger amounts of polyesters were also used in heater ducts, bus and truck bodies, replacement fenders and body patching of cars.

Geographically, the market extends from coast-to-coast, British Columbia being the largest after Ontario and Quebec.

Analysis of the Canadian market by major uses indicates that by far the largest outlet for polyester resins, over 80 per cent in 1964, is in reinforced plastic moulding materials; much of the remainder is devoted to surface coatings and patching compounds. Annual consumption in the last eight years was estimated as in the following table. The Board has little information with which to check the level of imports shown, although at the public hearing imports were estimated to be about 10 per cent of the market, which would suggest a lower level of imports than that shown in the following estimate. On the other hand, the Board has information to suggest that production in Canada in 1963 and 1964 was somewhat higher than in the estimates below. For example, in a Tariff Board survey, production by six companies in 1963 was reported to be more than 9 million pounds, virtually all of which was for domestic sale.

Consumption of Polyester Resins, 1957-64

	<u>Production</u>	<u>Imports</u>	<u>Exports</u>	<u>Consumption</u>
		- thousands of pounds -		
1957	2,450	750	small	3,200
1958	3,200	800	"	4,000
1959	5,200	800	"	6,000
1960	6,300	1,200	"	7,500
1961	8,000	1,500	"	9,500
1962	7,500	2,500	"	10,000
1963	8,300	2,500	"	10,800
1964	9,100	2,600	"	11,700

Source: Canadian Plastics, various issues

⁽¹⁾ Canadian Plastics, various statistical issues

⁽²⁾ Same, Feb. 1965, p. 29

Data available from the D.B.S. indicate that the total value of factory shipments of polyester resin was about \$2.4 million in 1961, \$2.7 million in 1962 and \$3.2 million in 1963.⁽¹⁾

Imported resins include a patented fire retardant type from the U.S.A. which, at the time of the hearing, sold for between 38 cents per pound and 48.5 cents per pound compared with about 30 cents per pound for standard polyester resins.

Besides the imports of resin, the Board was told that "reinforced polyester shapes valued at several million dollars are imported annually into Canada."⁽²⁾ Canadian Plastics estimated that imports of reinforced synthetic resin shapes, mostly polyester, amounted to about \$3.5 million both in 1960 and 1961 and expressed the view that Canadian moulders did not make any progress in cutting into this competition although, because the market increased, they did manage to hold a greater proportion of the sales for themselves.⁽³⁾

Exports of polyester resins were represented as small.

Pricing Policy and Prices

Generally, Canadian prices of polyester resins were considered to be competitive with the prices of imported materials. The situation at the time of the public hearings was reported to be more favourable to the Canadian producer than it had been a year or two previously, because the surcharge was in effect and the exchange rate more favourable.

Prices in Ontario and Quebec are said to be usually quoted on a delivered basis but in other parts of Canada they are augmented by at least partial freight charges. Mention was also made of the fact that "The advantage at the present time to the Canadian producer in eastern Canada would be less when he sells polyester resins in British Columbia because there is the competition of polyester producers on the U.S. Pacific Coast."⁽⁴⁾

Polyester resins were reported to sell from 27 cents to 35 cents a pound, in drums, truckload quantities, in Ontario and Quebec. Published prices of general purpose resins in Canada and the U.S.A. have declined in recent years.

(1) D.B.S., Manufacturers of Plastics and Synthetic Resins, Cat. No. 46-211

(2) Transcript, Vol. 130, p. 19451

(3) Canadian Plastics, February 1962, p. 39

(4) Transcript, Vol. 130, p. 19464

Prices of Polyester Resin, General Purpose,
1961-64

	Canada	U.S.A.
	cents per lb., carload, delivered	cents U.S. per lb., truckload, delivered
1961	31.0	28 - 30
1962	31.0	28 - 30
1963	29.5	28 - 30
1964	29.5	25 - 26
1965	28.0	..

Source: Canadian Chemical Processing, various issues; U.S.A.
Chemical & Engineering News, various issues

Tariff Considerations

Polyester resins, in various forms, are entered principally under the following items:

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
901(a) Synthetic resins without admixture, including scrap or waste: 3. Polyester type	5 p.c.	5 p.c.
(b) Synthetic resins in the form of aqueous emulsions, aqueous dispersions or aqueous solutions, without admixture: 3. Polyester type	5 p.c.	5 p.c.
(c) Synthetic resins in organic solvents where the solvent is not more than 60 per cent by weight, without other admixture: 3. Polyester type	12½ p.c.	12½ p.c.
902 Synthetic resins, compounded with other materials, in any form, including scrap or waste, for moulding, casting, extruding, calendering, pressing, (moulding compositions or materials for processing into moulding compositions); synthetic resins compounded with other materials in the form of not fully cured preforms or not fully cured blanks for compression mouldings: (b) Polyester type	5 p.c.	5 p.c.

<u>Item</u>		<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
904	Synthetic resin compositions, n.o.p.	15 p.c.	15 p.c.
905	Synthetic resin plates, sheets, film, sheeting or strips, not less than 6 inches in width, n.o.p., synthetic resins lay-flat tubing, not less than 6 inches in circumference, n.o.p.:-		
(f)	Other type:		
	1. Plain, uncoated, undecorated	Free	Free
	2. Other	10 p.c.	10 p.c.
906	Synthetic resin plates, sheets, film, sheeting or strips, less than 6 inches in width, lay-flat tubing less than 6 inches in circumference, other tubing, blocks, bars, rods, non-textile mono-filament; synthetic resin profile shapes produced in uniform cross-section and imported in lengths: not further manufactured than moulded, cast, calendered, extruded or pressed, n.o.p.:-		
	(e) Other type	15 p.c.	15 p.c.
916	Laminated moulded plastics products, n.o.p., having synthetic resins or cellulose plastics as the chief bonding (impregnating) agents	15 p.c.	15 p.c.
917	Reinforced or supported synthetic resin or cellulose plastics plates, sheets, sheeting, strips, tubing, blocks, bars, rods, in which is incorporated a layer of paper, fibreboard, or textile fabric, or a core of fibres whether matted or otherwise arranged, n.o.p.:-		
	(b) Other	15 p.c.	15 p.c.

In addition to the general representations, there were seven submissions made to the Board dealing with polyesters and related products. The resin manufacturers were unanimous in their support of rates of duty of 15 p.c., B.P. and 20 p.c., M.F.N. as contained in the Industry Committee's tabulation. The three paint companies — British American Paint Co. Ltd., Canadian Pittsburgh Industries Ltd. and the Glidden Company Limited — manufacturers of oil-free polyester resins, made a joint submission in support of these rates. Canadian General Electric Company Limited, Naugatuck Chemicals Division of Dominion Rubber Limited and Reichhold Chemicals (Canada) Limited⁽¹⁾ also supported the proposal for 15 p.c., B.P. and 20 p.c., M.F.N. for unsaturated polyester resins under B.T.N. heading 39.01.

(1) Transcript, Vols. 126, 129 and 130

Two companies that import polyester resins also made representations on these resins. Canadian Buttons Limited, which reported that it required a particular type of polyester that is entered under item 901(a)3 at 5 p.c., B.P. and 5 p.c., M.F.N., recommended that these rates remain unchanged.⁽¹⁾ A.S. Paterson Company Limited, importer for the Hooker Chemical Company, requested that fire retardant polyester resins, also imported under tariff item 901(a)3, be duty-free under both the B.P. and M.F.N. Tariffs, as materials not made in Canada.⁽²⁾

In a letter to the Board, Dura Chemicals Ltd., manufacturers of polyester car patching compound, indicated that the company favoured continuation of the existing 5 per cent duty on imports of the compound only if the same rate could be obtained for Canadian exports of the product; otherwise the "rate of duty should be raised to meet the rate of duty on export."⁽³⁾

The Society of the Plastics Industry of Canada Incorporated, Reinforced Division, in its submission on B.T.N. headings 39.01, 39.03 and 39.07 recommended that the rates of duty on glass fibre reinforced polyester panel, imported at present under tariff item 917b, be raised to at least 25 p.c., B.P. and 30 p.c., M.F.N.⁽⁴⁾ Although some of this material would be classified under B.T.N. heading 39.01, the submission is discussed under heading 39.07.

The Canadian Pulp and Paper Association opposed any increase in rates of duty on materials used by its members and listed polyester resins as such materials.⁽⁵⁾

Arguments in Support of Tariff Proposals

The polyester resin manufacturers claimed that, because of excess capacity and the relatively small domestic market, competition from imports, particularly from the U.S.A., could not be met adequately under existing duty rates.⁽⁶⁾ At the same time, however, it was indicated that Canadian prices had become, as a result of the surcharges in effect at that time and the depreciated exchange rate, comparable to the laid-down costs of imports. This situation, it was mentioned, had opened up new domestic markets for polyester producers.

The concern of Canadian Buttons was with a particular type of polyester resin required in the manufacture of moulded pearl type buttons. This type had to be imported from the U.S.A. because no suitable Canadian form of the resin was available. According to the representations, the button market was very competitive and the company would not be able to cope with an increase from the present 5 p.c. rate to 15 p.c., B.P. and 20 p.c., M.F.N. In this connection, however, some difficulty was envisaged in making a distinction for tariff purposes between this form and other polyester resins.

(1) Transcript, Vol. 161, p. 23971

(2) Same, Vol. 131, p. 19533

(3) Same, Vol. 163, p. 24252

(4) Same, Vol. 163, p. 24188, 24191

(5) Same, Vol. 129, p. 19360

(6) Same, Vol. 129, p. 19362; Vol. 130, p. 19437

According to A.S. Paterson Company, its fire retardant polyester resins are unique and "are not currently made in Canada nor is it anticipated that they will be made in Canada in the foreseeable future because of the limited market." (1) It was further stated that the "present tariff of 5 p.c. and the proposed tariff of 20 p.c. only serve to penalize the Canadian processor and the Canadian consumer." (2) However, it was also suggested by one observer that since nearly all the material was sold to the Federal Government for defence applications, the matter of tariff rates lost some of its commercial importance.

Dura Chemicals claimed that its concern was not so much with compounds coming into Canada as with the high tariff protection of other countries.

POLYAMIDES

The Products

The polyamides are a group of thermoplastic resins characterized by recurring amide linkages as part of the main polymer chain. By far the most important of this group is nylon, the generic term for certain high molecular weight, filament-forming polymers with related but not identical chemical composition. Nylon is a very strong, tough and relatively stiff material with a high degree of resistance to impact and abrasion. It is unaffected by most common chemicals, greases and organic solvents and is able to withstand extremes of temperature.

Nylon polymer is manufactured in several different formulations; the two most common types are known as nylon 6/6 and nylon 6. The manufacture of nylon 6/6, or polyhexamethylene adipamide, is a complex process which begins with the oxidation of cyclohexane, proceeds to the combination of adipic acid (6 carbon atoms) and hexamethylene diamine (6 carbon atoms) to form hexamethylene diammonium adipate, known as nylon 6/6 salt, and culminates with the polymerization of the nylon salt. The production of nylon 6, or polycaprolactam, usually begins with cyclohexane (6 carbon atoms) and, after several intermediate steps, which are different from those used for nylon 6/6, concludes with the polymerization of caprolactam in a process similar to that used to obtain nylon 6/6 polymer from nylon 6/6 salt. These two polymers display almost identical properties, the only significant differences being that nylon 6 is less stiff and has a slightly lower melting point. Their major use is in the extrusion of nylon filaments for the production of synthetic textiles and tire cord. Most of the remaining output is in the form of moulding powders for use as "engineering plastics" in the manufacture of such products as valve pieces, gears, cams, bearings and other mechanical parts where a combination of abrasion, impact and chemical resistance plus a low co-efficient of friction is required.

(1) Transcript, Vol. 131, p. 19532

(2) Same, Vol. 131, p. 19533

The other principal nylon in commercial use, although in much lower volume than the two referred to above, is nylon 610 which is produced from hexamethylene diamine and sebacic acid (10 carbon atoms) in a process much like that employed for nylon 6/6 except that sebacic acid is used instead of adipic acid. Its properties are much the same as those of nylon 6/6, the only important differences being a lower rate of moisture absorption, a lower melting point and greater flexibility. Nylon 610 which, because of its moisture resistance, displays superior electrical insulating qualities to the other nylons, has found its widest application as a coating for wire and in moulded housings for electrical tools and appliances. In Canada, however, its use appears to be confined to the production of large cross-section monofilaments which are made into bristles for household, paint and industrial brushes.

There are a number of non-fibre forming polyamides of relatively low-molecular weight which are not included in the nylon category. The only ones of any commercial significance in Canada are the "Versamid" type, used in protective coatings, adhesives and printing ink, and the epichlorohydrin type used mainly to strengthen paper.

The Industry

The nylon industry had its beginnings in Canada in 1942 when Canadian Industries Limited initiated the production of nylon yarn from imported nylon 6/6 polymer at Kingston, Ontario. Production of polymer from imported nylon 6/6 salt was begun in 1947 and four years later the manufacture of the salt itself from imported intermediates was embarked upon. Finally, in 1953, the production of nylon 6/6 became an integrated, domestic operation when the manufacture of the various intermediates required for the production of nylon salt began at Maitland, Ontario.(1)

In early 1963, at the time of the hearing before the Board on polyamides, Du Pont of Canada Limited, which had taken over the nylon component of the business when it split off from C.I.L. in 1954, was the only Canadian manufacturer of nylon resin and its production at the Maitland plant was confined to the nylon 6/6 type. The major share of this production is captive to Du Pont's manufacture of nylon yarn, staple and monofilament at the Kingston works. Data concerning production and plant capacities are confidential.

Patent protection permitted Du Pont to maintain its position as sole Canadian producer of nylon for over 15 years but with the expiration of patent rights in 1963 the situation changed. As yet there are no other producers of the polymer but several firms have entered into the manufacture of nylon fibres. Millhaven Fibres Limited (C.I.L. and Chemcell (1963) Ltd.) has a plant at Millhaven, Ont. which is said to be capable of producing some 7 million pounds of nylon 6/6 fibre per year. Courtaulds Canada Synthetic Fibres Ltd. is now making nylon 6 fibre at Cornwall, Ont. with an estimated capacity of about 12 million pounds.(2) Union Carbide announced, early in 1965, that it was building

(1) A general note on nylon intermediates is given under B.T.N. heading 29.22

(2) Chemical and Engineering News, Dec. 21, 1964, p. 50

a nylon 6 fibre plant at Arnprior, Ont., which is expected to go into production in 1966 with a capacity of 6 million pounds a year.⁽¹⁾ Millhaven Fibres could purchase nylon 6/6 polymer from Du Pont or could import it. Courtaulds is understood to import polycaprolactam, the nylon 6 polymer, from European suppliers. Union Carbide has stated that it intends to manufacture some of its own requirements of polycaprolactam, probably importing the caprolactam salt.

Aside from the manufacture of nylon 6/6 resin by Du Pont, the only other production of polyamides taking place in Canada at the present time appears to be that of a special non-nylon type known as polyamide-epichlorohydrin. The producer of this material, Hercules Powder Co. (Canada) Ltd., appeared before the Board and reported that it had begun to manufacture epichlorohydrin resin in aqueous solution in 1961 at a plant at Burlington, Ont.⁽²⁾ The resin is used by the paper and allied industries to impart wet strength to paper. Hercules, which prior to 1961 had imported these resins from its affiliated company in the U.S.A., produces the polyamide under its own patent and, at the time of the public hearing, indicated to the Board that it had ample capacity to meet present Canadian demand.

The Market

Data on production and shipments of nylon polymer in Canada are confidential. Judging from reports in trade periodicals, however, there appears to be fairly broad agreement that domestic consumption is close to 50 million pounds, valued at over \$80 million, and is expanding rapidly. The following excerpts are illustrative:

"The nylon market in Canada today is estimated at \$80 million annually and is divided into four general areas, textile, automotive, home furnishings and industrial applications. About 60% goes into consumer textile operations, 30% into automobile tire cord and the remainder into a variety of uses including carpeting, industrial belting and furniture fabrics."⁽³⁾

"Nylon has proved a versatile fiber; over 25 million lbs. were used last year in apparel and hosiery. Meanwhile nylon tire yarn is moving toward a 20 million lbs. market in '64..."⁽⁴⁾

"Nylon demand in Canada has grown at least one third in two years — from 30 million pounds in 1962 to a current level of 40 to 45 million pounds."⁽⁵⁾

"The market for nylon has been growing at a rate of 10% - 15% per year recently. Annual Canadian consumption is estimated at 45 million lb., worth about \$85 million."⁽⁶⁾

(1) Financial Post, Feb. 13, 1965, p. 32

(2) Transcript, Vol. 126, p. 18830

(3) Canadian Chemical Processing, Oct. 1964, p. 4

(4) Chemical Week, Dec. 12, 1964, p. 42

(5) Chemical and Engineering News, Dec. 21, 1964, p. 50

(6) The Financial Post, June 12, 1965, p. 63

It might be noted that the value of \$80 million is for filaments and fibres, not for the basic resin. At a price of perhaps \$1 a pound, as quoted to the Board, 50 million pounds of the polymer would have a value of \$50 million. Even at this reduced value, nylon would probably rank first among the polymers in value of consumption. Notwithstanding the large volume of nylon produced in Canada, the amount of the polymer which enters into commercial markets is relatively small. All of the nylon resins are produced by Du Pont and the major share of it is used by that company for the manufacture of various filaments which are sold principally for the manufacture of tires and textiles, including carpeting. Du Pont also exports significant amounts of nylon 6/6 for conversion into fibres and a small volume for moulding purposes; some moulding compounds are also marketed domestically by Du Pont. Very minor amounts of nylon 6/6 moulding compounds are imported by Du Pont to meet the demand for certain specialized types which the company does not produce. Du Pont is understood to be the sole importer of nylon 610 polymer which it gets from its U.S. parent company for use in the manufacture of bristles in brushes of various kinds.

Reference was made during the hearing to imports of nylon 6, all of which, it was said, were used for moulding purposes and most of which came from West Germany. Four importers of these moulding compounds were mentioned. There was also a submission to the Board from Mr. Lacy Falk, of Montreal who imports nylon 6 in the form of non-textile monofilaments.⁽¹⁾

Other references to imports of nylon or other polyamide resins included a moulding type used in the manufacture of buttons,⁽²⁾ and a special polyamide resin used mainly in the production of printing ink, adhesives and protective coatings.⁽³⁾

Such statistical information as is available concerning the nylon market in Canada relates only to the less than ten per cent of production consumed by those companies generally considered to constitute part of the plastics industry. The following table covers the period 1962 to 1964:

Estimated Consumption and Source of Supply of Nylon Resins in the Secondary Plastics Industry, 1962-64			
	<u>1962</u>	<u>1963</u>	<u>1964</u>
	thousand pounds		
Production	500	550	650
Imports	50	200	150
Exports	50	40	50
Consumption	500	710	750

Source: Canadian Plastics, Feb. 1964 and 1965

- (1) Transcript, Vol. 174, p. 28551
 (2) Same, Vol. 161, p. 23972
 (3) Same, Vol. 132, p. 19676

These figures, while modest in comparison with estimates of the total use of nylon, indicate a relatively impressive rate of domestic growth in both production and consumption. Imports appear to be playing a more significant part in the market during 1963 and 1964 which probably reflects the growth in consumption of nylons not produced in Canada. Exports remained fairly steady over the three year period.

Price data on polyamides were not made public during the Board's hearings. Canadian prices of nylon resin were said to be comparable with import prices and it can be assumed, therefore, that published U.S. prices, which range from 90¢ to \$2.18 per pound for nylon moulding powders, are indicative of prices prevailing in Canada for these forms. U.K. prices of these products were reported to be higher than those in Canada.(1) Information submitted to the Board, after the public hearing, by Courtaulds Canada Limited made reference to a price for Nylon 6 polymer, f.o.b. Europe, of 75 cents a pound, resulting in an estimated landed price of about \$1 a pound. Non-nylon polyamide prices, such as those for the type imported into Canada for use in adhesives, paints and inks are listed from 55¢ to 78¢ per pound in the U.S.A.

In summary, the expanding market for nylon in Canada continues to reflect, as it has in the past, the dominance of one producer and, on the demand side, a concentration on filaments required for the manufacture of clothing, tires and carpeting. However, three additional producers have recently entered the market as manufacturers of fibres and filament and one of these has indicated an intention to make the nylon polymer. At the same time other uses for nylon are developing; these applications have apparently relied somewhat more on imported supplies of polymer than has been the case with filaments.

Tariff Considerations

The polyamides are dutiable chiefly under the following tariff items:

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
654a Pins or pegs of synthetic resin used as bristles in the manufacture of brushes	Free	5 p.c.
901 (a) Synthetic resins without admixture, including scrap or waste:		
4. Polyamide type	Free	Free
(b) Synthetic resins in the form of aqueous emulsions, aqueous dispersions or aqueous solutions, without admixture:		
4. Polyamide type	Free	Free

(1) Transcript, Vol. 131, p. 19590

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
901	(c) Synthetic resins in organic solvents, where the solvent is not more than 60 per cent by weight, without other admixture: 5. Other type	10 p.c.
902	Synthetic resins, compounded with other materials, in any form, including scrap or waste, for moulding, casting, extruding, calendering, pressing, (moulding compositions or materials for processing into moulding compositions); synthetic resins compounded with other materials in the form of not fully cured preforms or not fully cured blanks for compression mouldings: (f) Other type	Free
904	Synthetic resin compositions, n.o.p.	15 p.c.
905	Synthetic resin plates, sheets, film, sheeting or strips, not less than 6 inches in width, n.o.p.; synthetic resin lay-flat tubing, not less than 6 inches in circumference, n.o.p.:— (f) Other type 1. Plain, uncoated, undecorated 2. Other	Free 10 p.c.
906	Synthetic resin plates, sheets, film, sheeting or strips, less than 6 inches in width, lay-flat tubing less than 6 inches in circumference, other tubing, blocks, bars, rods, non-textile monofilament; synthetic resin profile shapes produced in uniform cross-section and imported in lengths: not further manufactured than moulded, cast, calendered, extruded or pressed, n.o.p.:— (e) Other type	15 p.c.
916	Laminated moulded plastics products, n.o.p., having synthetic resins or cellulose plastics as the chief bonding (impregnating) agents	15 p.c.
917	Reinforced or supported synthetic resin or cellulose plastics plates, sheets, sheeting, strips, tubing, blocks, bars, rods, in which is incorporated a layer of paper, fibreboard, or textile fabric, or a core of fibres whether matted or otherwise arranged, n.o.p.:— (b) Other	15 p.c.

Nylon

There were several submissions to the Board dealing specifically with nylon polyamides and a number of more general references which included proposed rates for polyamides. The principal brief came from Du Pont of Canada Limited with the recommendation that rates of 25 p.c., B.P. and 30 p.c., M.F.N. be applied to all polyamides under B.T.N. 39.01. Courtaulds Canada Synthetic Fibres Ltd. and Union Carbide Canada Limited, while they did not make representations to the Board during the public hearings, submitted proposals at a later date; Courtaulds recommended that both caprolactam monomer (B.T.N. 29.35) and polycaprolactam (39.01) be free of duty until Canadian production is available "at which time we would not of course object to the imposition of rates of duty reasonable in relation to those of the fibres and yarns manufactured therefrom;"(1) Union Carbide proposed a 5 per cent B.P. and M.F.N. rate on the caprolactam monomer "when not made in Canada" and 15 p.c., B.P. and 20 p.c., M.F.N. on the polymer.(2) Millhaven Fibres Limited, the other producer of nylon fibres, did not make a submission, but one of its principals, Canadian Industries Limited, recommended more generally rates of 15 p.c., B.P. and 20 p.c., M.F.N. for an item like heading 39.01 of the B.T.N.(3) While Canadian Buttons Ltd. at first requested that the present duty-free status of nylon moulding powders used in the manufacture of buttons remain unchanged, the company withdrew the request on learning that the compounds apparently were available from Canadian manufacture.(4)

The submission made by Du Pont with respect to polyamides dealt in turn with nylon 6/6, 6, and 610 and was the culmination of earlier submissions covering the intermediates used to produce the polymers. Although the company produces only nylon 6/6, it indicated that the tariff proposals were intended to cover all the polyamides, including the non-nylon type, on the grounds that Du Pont accounted for virtually all (between 90 and 98 per cent) of the polyamides used in Canada. Primarily, the pattern of rates recommended was designed to ensure that Canadian requirements for nylon intermediates as well as resins will be produced domestically. As stated in its general brief dealing with the intermediates, Du Pont was seeking to ensure effective protection on its manufacture of intermediates as well as end-products by providing the same rates of duty on the intermediates as on the end-products. It was the company's view that the level of tariff protection proposed would not increase prices of nylon but only serve to secure the domestic market for production in Canada. The selling price of nylon fibres, it was said, is controlled at the upper limit by the duties on fibres, fabrics, and other textile products rather than the duties on intermediates and resins.(5) Without adequate protection, the cost advantage which foreign producers were said to have would make it possible for imports to displace domestic production and thereby prevent the volume increase that could lead to a lowering of unit costs in Canada. In its initial submission to the Board, Du Pont offered a threefold explanation as to why the Canadian industry now required the protection

(1) Submission by Courtaulds Canada Synthetic Fibres Ltd., Feb. 11, 1964

(2) Submission by Union Carbide Canada Limited, May 29, 1964

(3) Transcript, Vol. 132, p. 19737-8

(4) Same, Vol. 161, p. 23972; Vol. 162, p. 24001

(5) Same, Vol. 131, p. 19580

of a tariff at the proposed level. Expiration of patents, principally those relating to the techniques by which the polymer is converted into yarn, was one of the reasons given. The threat of imports resulting from growing excess foreign capacity coupled with higher costs of manufacture was another and the third was that the Canadian market had developed to a point where other companies, including foreign polymer producers anxious to find outlets for their surpluses, might decide to undertake nylon spinning based on imported raw materials.⁽¹⁾ According to the company, "the tariffs recommended ... will influence other producers entering the field to base their operation on nylon intermediates either purchased from a Canadian source or made by themselves on an integrated basis in Canada."⁽²⁾

The fact that Du Pont imported its requirements of nylon 610 did not prevent the company from proposing the same level of duties for this product as it had on the other polyamide resins. The Board was told that consumption had not been large enough in the past to warrant domestic production of this polymer but, on the basis of demand forecasts, production could begin fairly soon if the market were suitably protected.

The principal objection to the Du Pont proposals came in the form of special submissions from Courtaulds and Union Carbide prepared after the hearing in answer to a request from the Board for comments on Du Pont's submission. Both these companies are involved with the production of nylon 6 fibre and were particularly concerned about the rates proposed by Du Pont on the raw materials required to manufacture this product. Courtaulds in its statement commented that:

"In view of the fact that neither caprolactam monomer nor caprolactam polymer is available from Canadian production, it appears to us that these products meet all the requirements, established by the Chemical Industry Committee, during the course of the hearings, for inclusion in 'List 3'; a category designed to cover goods of a class not made in Canada."

And further:

"The concern expressed by Du Pont about the competitive dangers from caprolactam intermediates and complete lack of any concern about duty free entry of equally competitive intermediates [e.g. those for polyester and polypropylene yarns] suggests that the rates of duty proposed are designed as much to offset potential competition due to technological developments as to equate the cost of efficient Canadian production with the cost of similar production abroad."⁽³⁾

The company's position is further expressed in the following statement:

⁽¹⁾ Transcript, Vol. 64, p. 9571

⁽²⁾ Same, Vol. 64, p. 9588

⁽³⁾ Submission by Courtaulds Canada Synthetic Fibres Ltd., Feb. 11, 1964

"We do not believe that tariffs should be used to preempt the market for the incumbent producer. Neither do we believe that tariffs should be used to discourage the introduction and development of new products and technologies even though they may be competitive with existing Canadian production."(1)

The submission made by Union Carbide to the Board expressed general agreement with the views expressed by Courtaulds although it drew somewhat different conclusions. The company's basic position was that "goods made in Canada or which compete directly with goods made in Canada should have tariff protection of 15 per cent B.P. and 20 per cent M.F.N."(2) Since it was recognized that nylon 6 (polycaprolactam) and nylon 6/6 were competitive in most applications the company recommended that the same rates apply to both resins. Union Carbide, however, did not consider the raw materials, caprolactam and nylon 6/6 salt, used to make the two resins to be competitive and proposed that, since caprolactam was not made in Canada, it should be considered as an exception and carry a nominal rate of 5 per cent B.P. and M.F.N. Such a rate would encourage monomer production as soon as market conditions warranted and give "a measure of protection to Du Pont while permitting competing facilities."(3) In the administration of the Customs Tariff, caprolactam is not ruled to be of a kind made in Canada.

Courtaulds, in a commentary on Union Carbide's submission, stated that there was no justification for a 5 per cent rate on the caprolactam monomer while it is not produced in Canada. The company also maintained that the argument for a duty on the polymer depended on whether it would be freely available for sale. In the words of the commentary:

"Unless Union Carbide produce polycaprolactam in Canada, in a form suitable for our use in the production of nylon 6 filament, in quantities adequate to look after our needs, and made available at competitive prices, we must protest most strongly against polycaprolactam being regarded as a material to be dutiable at rates appropriate to goods with made-in-Canada status."(4)

Courtaulds was not concerned with polycaprolactam for moulding purposes, and made no objection to rates of 15 p.c., B.P. and 20 p.c., M.F.N., as proposed by Union Carbide, for this material if circumstances warrant such duties; in this connection, however, the company pointed out that the Board, if it decided on such rates for moulding resins, could also recommend, under Reference 120, upward adjustments in the rates applicable to many moulded products whereas for products made from nylon filament, it could not do so because the textile products were not within the terms of Reference 120.

(1) Courtaulds, quoted work

(2) Submission of Union Carbide Canada Limited, May 19, 1964

(3) Same, p. 2

(4) Commentary by Courtaulds Canada Synthetic Fibres Ltd. on the submission by Union Carbide Canada Limited, June 26, 1964

Du Pont replied to the submissions by Courtaulds and Union Carbide. One additional issue that arose was whether, at the prevailing monomer and polymer prices, the duties proposed by Du Pont would effectively preclude production of nylon 6 in Canada. Courtaulds had taken the position that the nylon 6 polymer was available at 75 cents a pound, f.o.b. Europe, and that the imposition of a duty as proposed by Du Pont, together with costs of transportation, handling, etc., would prevent the company from having nylon 6 polymer available at a price as low as that of Du Pont's end-product, tire yarn. Du Pont indicated that caprolactam monomer was available at 49 cents a pound; the monomer could be converted to polymer for 11 cents a pound, resulting in a final price of 60 cents a pound, well below that used in the calculation by Courtaulds. Du Pont went on to suggest that the monomer could, in fact, be obtained at 37 cents a pound. These price data Courtaulds, in turn, disputed.

Du Pont reiterated the company's position that the proposed duty would encourage production in Canada. Without the duty, a company likely would find it more profitable to import the product than make it in Canada.

Courtaulds' suggestion that Du Pont sought protection to offset competition resulting from technological developments also was denied by Du Pont. The company was said to be "in the vanguard of technological advance" and that it knew of "no actual or potential technological advances with respect to nylon 6 which would cause us to alter our statements made before the Board [regarding technological developments and proficiency]." (1)

Du Pont contended that the substantial similarities of nylon 6 and nylon 6/6 required that their respective intermediates be subjected to the same rates of duty; otherwise, the effective protection on nylon 6/6 and its intermediates, which are made in Canada, would be nullified. Both Courtaulds and Union Carbide requested that the rates proposed by Du Pont not be applied to caprolactam and polycaprolactam.

With reference to nylon moulding powders, Canadian Buttons Ltd. stated that to its knowledge the material it required for the injection moulding of nylon buttons for military clothing was unavailable in Canada and the present duty-free status on this product under item 902(f) should, therefore, remain unchanged. (2)

The question of duties on nylon non-textile monofilament, now classified under tariff item 906(e) at 15 p.c., B.P. and M.F.N., was also raised before the Board. Du Pont produces these monofilaments in the range of 0.5 to 2 mm. diameter in Canada from both nylon 6/6 and nylon 610. They are used principally as bristles in brushes and compete with monofilaments made from other polymers such as nylon 6, polypropylene and polystyrene as well as with natural bristles. Pins or pegs of synthetic resin used as bristles in the manufacture of brushes may also be imported under tariff item 654a, Free, B.P., 5 p.c., M.F.N.; the natural bristles are free of duty under item 654. The latter item is not in Reference 120. No representations were made to the Board concerning item 654a.

(1) A reply by Du Pont of Canada Limited to the Submissions of Courtaulds Canada Synthetic Fibres Limited and Union Carbide Limited ... December 14, 1964, p. 4

(2) Transcript, Vol. 161, p. 23972

Du Pont considered that continued tariff protection is needed on these non-textile monofilaments, and the company proposed rates of 15 p.c., B.P. and 20 p.c., M.F.N. The particular level recommended was explained by the company in the following way:

"We have asked for higher duty rates on the raw materials (nylon 66 and nylon 610) but, if this protection is not to be diluted, a duty is needed on non-textile monofilaments. The duty on the non-textile monofilaments in this instance need not be as high as that recommended on the raw materials, because the rate is applied against a higher dollar value, and the resulting cost disadvantage to importation would be adequate to provide domestic manufacture with the degree of protection needed."(1)

Du Pont reported that most of the imported nylon monofilament is made from nylon 6 and its price was about 25 per cent below that of the domestic product. Germany was said to be the major source of these imports. A submission was received from Mr. Lacy Falk, an importing agent for a producer in Germany of this nylon 6 non-textile monofilament. Mr. Falk argued that since the nylon 6 product was much different in quality from that produced by Du Pont there was no justification for increasing the present rate of duty as proposed by that company.(2)

Other Polyamides

Among the other briefs submitted to the Board, Hercules Powder Company (Canada) Limited, proposed rates of 15 p.c., B.P., 20 p.c., M.F.N., for the products classified under tariff item 901(a)4.(3) Caledonia Chemicals Ltd. recommended that polyamide resins of the non-nylon type be listed as an exception to the heading rates and remain free of duty until such time as they are made in Canada.(4) Minnesota Mining and Manufacturing of Canada Ltd. proposed that polyamide resins in liquids or pastes be exempted from the Chapter headings rates until made in Canada.(5) but subsequently, in a letter to the Board, withdrew this request. Paisley Products of Canada Limited requested that polyamide-type materials be dutiable at 15 p.c., B.P. and 20 p.c., M.F.N., as an exception from the company's proposed heading rate for B.T.N. 39.01 of 5 p.c., B.P. and 10 p.c., M.F.N.(6) W.R. Grace & Co. of Canada Ltd. made specific reference to polyamide resin and film in its submission and included these items in its general proposal favouring the status quo with respect to products under 39.01 and 39.02.(7)

Caledonia Chemicals Ltd. took the position that, because the polyamide resins which it imported were completely different from nylon resins in most respects, they should be listed as exceptions and remain

(1) Transcript, Vol. 131, p. 19640

(2) Same, Vol. 174, p. 28551

(3) Same, Vol. 126, p. 18833

(4) Same, Vol. 132, p. 19679

(5) Same, Vol. 162, p. 24087

(6) Same, Vol. 123, p. 18488

(7) Same, Vol. 136, p. 20243

free of duty. The company stated that neither the resins nor the principal raw materials are made in Canada or are likely to be in the foreseeable future; in these circumstances a duty would offer no protection, but would simply raise the cost of the product to the consumer. As to the problem of distinguishing between different types of polyamides for tariff purposes, Caledonia explained that, although nylons are polyamides, the particular polyamides which the company imports are never known as nylon, and added that:

"the Department of National Revenue has several rulings on each grade of polyamide and we have never had any trouble. They fully understand."(1)

In order to separate the two types of polyamides in the Tariff it was suggested that the non-nylon type might be described as "polyamide made with the use of polymeric fat acids,"(2) During the public hearing, however, attention was drawn to the fact that a memorandum by the Department of National Revenue has been in existence for some years "to the effect that polyamide resins and moulding powders are of a class or kind made in Canada,"(3) and the view was expressed that such a ruling embraced the particular resins of interest to Caledonia. This circumstance was of no particular concern to importers as long as there was free entry for all polyamides but it might, of course, become of considerable importance if a duty were applied to the nylon type polyamides.

Hercules Powder Company (Canada) Limited, a domestic producer of urea-formaldehyde and polyamide-epichlorohydrin resins in aqueous solution, which enter respectively duty-free under tariff items 901(b)2 and 901(b)4, pointed out that its rate proposals of 15 p.c., B.P. and 20 p.c., M.F.N. for these products were in accord with the recommendations of the Industry Committee. In the view of the company, tariff protection was required to prevent the importation of competitive products which are "to the detriment of existing production facilities which are ample to meet Canadian requirements for some years to come."(4)

A Special Classification Problem

Du Pont made a special submission to the Board on Feb. 25, 1963 dealing with synthetic resin non-textile monofilaments. These materials are at present classified in the Canadian Tariff under item 906, as follows:

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
906 Synthetic resin plates, sheets, film, sheeting or strips, less than 6 inches in width, lay-flat tubing less than 6 inches in circumference, other tubing, blocks, bars, rods, non-textile monofilament; ... n.o.p.:-		
(e) Other type	15 p.c.	15 p.c.

(1) Transcript, Vol. 132, p. 19697

(2) Same, Vol. 132, p. 19700

(3) Same, Vol. 132, p. 19703

(4) Same, Vol. 126, p. 18832

There is a rather complex problem of classification which arises with these non-textile monofilaments in relation to the Brussels Nomenclature. Under the B.T.N., synthetic monofilaments are distinguished in terms of size rather than use and are divided between Chapter 39 (Plastics), which includes monofilaments of over 1 mm. in diameter, and Chapter 51 (Textiles), which takes in those monofilaments with a cross-section of 1 mm. and under.

If items based upon the provision of Chapter 39 replace the relevant existing items in the Canadian Tariff, special provision will be needed for those non-textile monofilaments of a diameter of 1 mm. or under which at present are entered under item 906(e). Du Pont produces monofilaments of 0.5 to 2 mm. diameter.

Du Pont initially proposed that all synthetic resin non-textile monofilaments, regardless of size, be included under the appropriate sub-sections of Brussels Chapter 39.⁽¹⁾ Later, however, the company modified its proposal and recommended that only the monofilaments of greater than 1 mm. in cross-section, those that meet the Brussels classification, be included in Chapter 39. Those classified in the B.T.N. as monofilaments, that is to say, of 1 mm. and less, which comprise about 95 per cent of Du Pont's business would, by Du Pont's proposal, be included in a residual tariff item, either the current 906(e), or some other tariff item that the Board would designate to take care of these residual items. The rates for these would be 15 p.c., B.P., 20 p.c., M.F.N. Du Pont's proposal for monofilaments was summarized as follows:

"We say that for all those over one millimeter allow the Brussels system to apply. Those under one millimeter, stick with the present system."⁽²⁾

LINEAR POLYESTER RESINS

Polyethylene Terephthalate

Linear polyesters are polycondensation products of terephthalic or adipic acid and ethylene glycol. Only one, polyethylene terephthalate, was brought to the Board's attention as significant in Canadian commerce.

Polyethylene terephthalate is a type of saturated polyester resin prepared from ethylene glycol and dimethyl terephthalate. The manufacture of the resin requires the production of a monomer, di (2 hydroxyethyl) terephthalate, which results from the catalyzed reaction of dimethyl terephthalate (D.M.T.) and ethylene glycol. The monomer is then polymerized to produce the polyethylene terephthalate resin. Titanium dioxide is added during the manufacturing process to reduce the lustre of the textile products made from the resin.

(1) Transcript, Vol. 131, p. 19637

(2) Same, Vol. 131, p. 19648

The principal uses for polyethylene terephthalate resins are in the manufacture of textile fibres and films.

Resin

Polyethylene terephthalate resin is made in Canada by Canadian Industries Limited at Millhaven, Ont., for its own use in the manufacture of "Terylene" polyester staple fibre, tow and filament yarn for the textile industry. At the time of the hearing, film was not made in Canada. The principal raw material, D.M.T., is not made in Canada and is imported from the U.S.A. Other materials, of which ethylene glycol is the most important, are obtained mainly from Canadian sources.

Plant capacity was represented as being adequate to supply present and foreseeable Canadian requirements and to take care of any available export business as well.(1) The Board was told that world capacity was increasing rapidly and that "there is going to exist an over-capacity of resin productive facilities."(2) However, a recently published report stated that capacity of the Millhaven Plant had been expanded well beyond the initial 10 million pounds a year and "that all plant was operating at full capacity."(3)

Since 1954, C.I.L., under an exclusive licence from Imperial Chemical Industries, which expires in 1970, has been licenced to manufacture and sell polyethylene terephthalate resins and articles made from them in Canada. The same type of material is produced in a number of other countries; "Dacron", for example, is made by Du Pont in the U.S.A. Copolymers are also produced with very similar properties. One particular copolymer of terephthalic acid was mentioned -- a polyester but not a polyethylene terephthalate. This product, known as "Kodel", was considered to be outside C.I.L.'s patent coverage; it is manufactured in the U.S.A., Germany and Japan.

Except for occasional though at times substantial exports, polyethylene terephthalate resin is not an article of Canadian commerce, at least in part because of patent control. C.I.L. indicated during the hearing that it knew of no imports of resin into Canada. However, competitive polyester fabrics are imported in the form of garments and a small amount in the form of fibres made of copolymers. Competition also arises from such similar synthetic fibres as the acrylics, nylons and polypropylenes. Men's clothing, particularly dress shirts and summer suits, has been the major outlet for polyester fibre, though other significant uses are reported to be developing. Some idea of the significance of polyester fibre in the U.S.A. is given by the increasing demand in that country, which was 305 million pounds in 1964 and is estimated at 352 million in 1965.(4)

Although exports of Canadian resins have taken place in substantial quantities to European markets, such opportunities are considered to be "spasmodic and unreliable and are not expected to be an

(1) Transcript, Vol. 132, p. 19744

(2) Same, Vol. 132, p. 19755

(3) The Financial Post, June 12, 1965, p. 63

(4) Modern Plastics, June 1965, p. 49

important factor in the company's operations in the future."⁽¹⁾ Prices are not published and exportations are said to be carried out on a negotiated basis rather than on an established selling price.

Polyethylene Terephthalate Film

The transparent film made from polyethylene terephthalate is extremely strong with good resistance to abrasion and flexing; it has excellent electrical insulating properties and good mechanical resistance. It is available in a variety of thicknesses and widths and has a number of uses including the manufacture of electrical capacitors, engineering drawing film, photographic base film, computer, audio and video tape, stamping foils and packaging materials.

This polyester film is not made in Canada and imports are largely from the U.S.A. and Britain. The principal British producer is Imperial Chemical Industries Limited whose brand name for the film is "Melinex". I.C.I. holds exclusive licences covering manufacture throughout the world, except in the U.S.A., where Du Pont is the holder of these rights and manufactures and sells the film under the trade name "Mylar". Du Pont also has selling rights in Canada. The Canadian patent was said to be valid until February, 1970.⁽²⁾

The market for polyethylene terephthalate film in Canada was estimated at 320,000 pounds in 1960, 580,000 pounds in 1961 and 740,000 pounds in 1962. Du Pont's spokesman stated that "Du Pont of Canada has during the past eight years imported this material from E.I. Du Pont in the United States and sold it under the trade name 'Mylar'".⁽³⁾ I.C.I. indicated to the Board that it expected to begin sales to the Canadian market in 1963.

Tariff Considerations

Polyethylene terephthalate resin and film are entered principally under the following items:

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
901(a) Synthetic resins without admixture, including scrap or waste: 3. Polyester type	5 p.c.	5 p.c.

⁽¹⁾ Transcript, Vol. 132, p. 19743

⁽²⁾ Same, Vol. 132, p. 19784

⁽³⁾ Same, Vol. 132, p. 19794

Item	British Preferential Tariff	Most Favoured- Nation Tariff
902	Synthetic resins, compounded with other materials, in any form, including scrap or waste, for moulding, casting, extruding, calendering, pressing, (moulding compositions or materials for processing into moulding compositions); synthetic resins compounded with other materials in the form of not fully cured preforms or not fully cured blanks for compression mouldings:	
	(b) Polyester type	5 p.c. 5 p.c.
904	Synthetic resin compositions, n.o.p.	15 p.c. 15 p.c.
905	Synthetic resin plates, sheets, film, sheeting or strips, not less than 6 inches in width, n.o.p.; synthetic resin lay-flat tubing, not less than 6 inches in circumference, n.o.p.:— (f) Other type:	
	1. Plain, uncoated, undecorated	Free Free
	2. Other	10 p.c. 10 p.c.
906	Synthetic resin plates, sheets, film, sheeting or strips, less than 6 inches in width, lay-flat tubing less than 6 inches in circumference, other tubing, blocks, bars, rods, non-textile monofilament; synthetic resin profile shapes produced in uniform cross-section and imported in lengths: not further manufactured than moulded, cast, calendered, extruded or pressed, n.o.p.:	
	(e) Other type	15 p.c. 15 p.c.
916	Laminated moulded plastics products, n.o.p., having synthetic resins or cellulose plastics as the chief bonding (impregnating) agents	
		15 p.c. 15 p.c.
917	Reinforced or supported synthetic resin or cellulose plastics plates, sheets, sheeting, strips, tubing, blocks, bars, rods, in which is incorporated a layer of paper, fibreboard, or textile fabric, or a core of fibres whether matted or otherwise arranged, n.o.p.:— (b) Other	
		15 p.c. 15 p.c.

It was noted at the public hearing that titanium dioxide often was added during the manufacturing process; such resin might then be dutiable either under tariff item 902(b) or under item 904.

There were seven submissions made to the Board with reference to polyethylene terephthalate, one on resins and the others on film. Canadian Industries Limited dealt with the resins and requested that they be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N.(1) The company indicated that these would fall under Brussels heading 39.01 as linear polyesters.

Imperial Chemical Industries Limited recommended that polyethylene terephthalate type film remain duty-free under the B.P. Tariff until such time as the film is "made in Canada in quantity substantial in relation to Canadian demand." (2) Deerfield Laminations Limited, which is in the business of coating plastic film, foils and papers with polyethylene for the packaging industry, made a representation concerning the imported polyester film known as "Mylar" and asked that consideration be given to an addition to tariff item 905 as follows: (3)

<u>Polyester Type:</u>	<u>B.P.</u>	<u>M.F.N.</u>	<u>General</u>
1. Plain, uncoated, undecorated	Free	Free	10 p.c.
2. Coated with vinyl type, vinylidene	Free	Free	10 p.c.
3. Coated with polyethylene	20 p.c.	20 p.c.	25 p.c.
4. Other	10 p.c.	10 p.c.	20 p.c.

W.R. Grace & Co. of Canada Ltd. (Cryovac Division) in its general submission on various resins and films under B.T.N. headings 39.01 and 39.02. referred to polyester films, plain and coated, and included them in its proposal that existing rates of duty be retained for products classified by these two headings. (4) Minnesota Mining and Manufacturing of Canada Limited requested that polyester film, plain and coated, including laminates thereof, coated with adhesive, with protective liner, when imported in rolls or sheets for conversion into commercial emblems, traffic sign faces, or other markings be free of duty under B.T.N. heading 39.01 until they are made in Canada and at that time be dutiable at 15 p.c., B.P and 20 p.c., M.F.N. (5)

Canadian Kodak Company Limited proposed that polyester photographic base film which is not made in Canada be allowed free entry under both B.P. and M.F.N. Tariffs. (6) In this connection, ANSCO of Canada Limited requested that if there were a single, duty-free tariff item covering photographic film it be worded to include sensitized film as well as unsensitized. (7) These two submissions are more fully dealt with under cellulose acetate of heading 39.03 and as plastics products under heading 39.07.

(1) Transcript, Vol. 132, p. 19743

(2) Same, Vol. 132, p. 19782

(3) Same, Vol. 148, p. 22055

(4) Same, Vol. 136, p. 20243

(5) Same, Vol. 162, p. 24087 and Letter to the Board, October 30, 1964

(6) Same, Vol. 160, p. 23746

(7) Same, Vol. 160, p. 23778

Arguments in Support of Tariff Proposals

In C.I.L.'s view "the rates of duty on resin should be high enough to defer entry of a second fibre producer until Canadian volume grows large enough to support two manufacturers profitably."⁽¹⁾ The objective of the company's proposals was explained as being to "avoid the fragmentation of the market which could take place by another importer or fibre producer bringing in imported polymer and circumventing the cost associated with the manufacture of that material when we have adequate facilities in this country to supply the market for the foreseeable future."⁽²⁾ The company spokesman indicated that the choice of rates of 15 p.c., B.P., 20 p.c., M.F.N., was for conformity with the industry's usual proposals.

It was asserted that, given equivalent volume, the company is as efficient as any producer in the world and that because of competition from similar products a tariff increase would not lead to increased prices but would simply ensure the continuation of the use of a Canadian made material. Without such an increase, however, world over-capacity plus the ease with which the product is transported and stored could lead to imports and to the production of yarns in Canada from imported resins. At the public hearing in 1963, the spokesman for C.I.L. said that his company was applying for an increase in rates, the significant effect of which would be in seven years time when the manufacturing patent expires.

Polyethylene terephthalate film, it was stated by Imperial Chemical Industries, Limited, is not manufactured in Canada and the company felt justified in requesting continuation of duty-free entry under the B.P. Tariff on the grounds that an increase in duty rates would penalize the Canadian consumer by increasing the cost of film which, in turn, would lead to increased prices of finished goods.⁽³⁾ Although the film is made from a resin essentially the same as that produced by C.I.L., the manufacture of film in Canada was thought to be unlikely because of the size of the Canadian market.

Deerfield Laminations was said to supply about 60 per cent of all polyethylene coated polyester film sold in Canada, the remainder being imported from the U.S.A. The company was concerned that the particular type of polyester film which it imported to coat with polyethylene was dutiable at 10 p.c. under 905(f)2 while the same film, after being coated with polyethylene, was also imported under the same tariff item at the same rate. The company's proposal was designed to improve the competitive position of the domestically produced material and "to enable us to proceed with export plans."⁽⁴⁾

(1) Transcript, Vol. 132, p. 19745

(2) Same, Vol. 132, p. 19762

(3) Same, Vol. 132, p. 19784-5

(4) Same, Vol. 148, p. 22055

POLYURETHANESThe Products

Polyurethane resins are produced by the reaction of a diisocyanate, usually toluene diisocyanate, with a polyhydroxy compound (a polyol). The latter is generally itself a polymer, such as a polyether or a polyester, but naturally-occurring hydroxyl-bearing oils such as castor oil can also be used. Other raw materials used in the industry include blowing agents, stabilizers, emulsifiers and catalysts. At the time of the hearing, it was indicated that most of the materials had to be imported.

The principal forms in which polyurethanes are used are flexible and rigid foams. These may be produced by what are described as "one-shot" and "two-shot" techniques. The latter, an older method, was described by a Canadian producer in the following terms:

"A prepolymer with controlled chain length is prepared by reacting excess diisocyanate with the polyol. This prepolymer is combined later with the 'crosslinking system' consisting of additional polyol, water and/or fluorocarbon blowing agent, catalyst(s) and foam stabilizers or emulsifiers, to produce a polyurethane foam. Materials of this type used to make rigid polyurethane foams are usually marketed as 2-package systems, one containing the prepolymer and the other a blend of the remaining components."(1)

In the "one-shot" technique, the diisocyanate is mixed with all the other ingredients at the time of foaming and there is no preparation of a prepolymer. Foams with fire retardant properties may be prepared by incorporating additives or by using polyols containing phosphorus or halogens.

Rigid foams have a density of from 2 to 15 pounds per cubic foot, but normally from 2 to 4 pounds. Their high strength-to-weight ratio and good insulating properties make them useful in such applications as foam-core wall panel construction, refrigeration, trailers, railroad cars and storage tanks. The densest forms are used for boat floatation and packaging.

Flexible foams are used in the production of cushioning for furniture and automobiles, in a number of specialty packaging operations and in making toys and other novelties. These foams have densities ranging from about 1.3 to 2 pounds per cubic foot.

Different types of polyurethane resins may be used to produce a variety of products other than foams. Liquid casting materials and gum polymers are used in the manufacture of such products as industrial wheels and belt chutes; spandex fibres are also produced from polyurethane. There are also a number of urethane coatings used in building, maintenance, industrial and marine applications.

(1) Transcript, Vol. 130, p. 19451

The Industry

Because of the existence of the "one-shot" system of producing polyurethane foam, it is difficult to classify firms to the different stages of the polyurethane industry. Canadian producers that made representations to the Board were: Naugatuck Chemicals Division of Dominion Rubber Limited, which does not produce foam but which makes "two-package" systems for sale to producers of rigid foams; Monsanto Canada Limited which produces flexible foams by the "one-shot" technique; Dynaflex Plastics Limited which makes flexible foams and foamed products from imported "two-package" systems and Reichhold Chemicals (Canada) Limited which makes oil-modified polyurethane resins for use in the production of varnishes.(1)

Interest in polyurethanes was recorded in a number of other submissions to the Board. Schenectady Chemicals Canada Limited (formerly Schenectady Varnish Canada Limited) imports polyurethane prepolymers for use in the manufacture of insulating materials for the electrical industry.(2) The Canadian Pulp and Paper Association reported that its members use polyurethane resins for coating compounds.(3) A.S. Paterson Company Limited made representations as the Canadian representative of the Durez Plastics Divisions of Hooker Chemical Corporation in the United States, which supplies polyurethane resins for foam, in "two-package" systems for the production of a rigid fire retardant foam based on hexachloroendomethylenetetrahydrophthalic acid (chlorendic acid).(4) The Minnesota Mining and Manufacturing Company of Canada Limited listed polyurethane resins in lumps, powders, granules, flakes, liquids and pastes among the products, not produced in Canada, used by the company.(5)

The Board has not a definitive list of Canadian producers in the polyurethane industry. Naugatuck Chemicals suggested that a number of other firms either produce and market, or simply market, two-package systems similar to the one produced by the company. These firms include: Taylor Chemical Foam Industries Limited, of Cornwall and Oakville, Ontario; Delany & Pettit Industries Limited, Toronto, Ontario; Cloud-foam Limited, Ajax, Ontario; Canadian Industries Limited and a number of other possible suppliers. Monsanto mentioned a number of other companies as important suppliers of flexible foam: Delany & Pettit Industries Limited, Toronto; B.F. Goodrich Canada Limited, at its sponge products plant at Waterville, Quebec; Hardifoam Products Limited, Toronto, Ontario and another producer in Vancouver, B.C.(6)

Naugatuck Chemicals estimated the Canadian market to be from 5 to 6 million pounds per year. The company suggested that almost all polyurethane resin used in Canada was in the form of foam, 80 per cent being in the form of flexible foam. The company indicated that it expected the market to increase 3 to 4 times in the next five years and that rigid foam would then represent about one third of the total.

(1) Transcript, Vols. 126 and 130

(2) Same, Vol. 127, p. 18931-2

(3) Same, Vol. 129, p. 19360

(4) Same, Vol. 131, p. 19531, 19543, 19555

(5) Same, Vol. 162, p. 24086

(6) Same, Vol. 130, p. 19480, 19497 and 19508

It was estimated that one half of the market for rigid foam and one half of the market for fire retardant foams, was being supplied by imports.

Monsanto quoted an estimate that the flexible foam market had grown to $6\frac{1}{2}$ million pounds by 1962, after six years of Canadian production.

The D.B.S. has published somewhat larger amounts for factory shipments of polyurethane foam by all industries:

Shipments of Polyurethane Foams, 1960-62

	<u>Polyester Type</u>		<u>Polyether Type</u>		<u>Total</u>	
	'000 lb.	\$'000	'000 lb.	\$'000	'000 lb.	\$'000
1960	..	..	..	..	2,750	2,663
1961	634	554	3,652	3,185	4,286	3,738
1962	840	855	6,885	6,326	7,725	7,181

Source: D.B.S., Cat. No. 47-208, Plastics Fabricators, n.e.s.

Naugatuck Chemicals indicated that the price for its systems was 77 cents per pound, in 5,000 pound lots, delivered in Ontario and Quebec. Monsanto reported that the Canadian price of cut flexible foam had dropped from the original figure of 30 cents per board foot to 11 to 13 cents per board foot, delivered in Ontario and Quebec, as compared to a price of $9\frac{1}{2}$ to 11 cents per board foot in the United States.

A factor influencing the Canadian market was said to be importations of foamed products, especially those produced by foaming-in-place, and of scrap polyurethane foam which can be used either with or without further processing.⁽¹⁾

Because of its bulk, foam is unlikely to be shipped long distances. No statistical information is available, but such imports as there are, other than scrap or finished products, are likely to be in the form of prepolymers or of resins other than those used for foam. Imports of foamed and expanded plastics, basic shapes and forms, in 1964 were 1.4 million pounds, valued at \$1.1 million, having declined from 2.8 million pounds, valued at \$2.1 million. It is not known, however, what portion of these imports is polyurethane. There is no indication of Canadian exports.

Tariff Considerations

The various parties making representations to the Board did not in all cases make clear the present tariff status of the goods with which they were concerned. Certain forms of polyurethanes are not within the Board's terms of reference, being classified as synthetic rubber under tariff items 616 and 618; in addition, plastic cellular

⁽¹⁾ Transcript, Vol. 130, p. 19454 and following

expanded or foamed clippings of polyurethane foam have been ruled by the Tariff Board, on appeal, to be "waste of all kinds" as provided for in tariff item 681.(1) For the two-package system, some of the components may not be resins, but be imported under items such as 208t, 220a, 711, 851 or 921; these items are in Reference 120.

The main tariff items that apply more particularly to polyurethane within the terms of Reference 120 are:

Item	British Preferential Tariff	Most- Favoured- Nation Tariff
902 Synthetic resins, compounded with other materials, in any form, including scrap or waste, for moulding, casting, extruding, calendering, pressing, (moulding compositions or materials for processing into moulding compositions); synthetic resins compounded with other materials in the form of not fully cured preforms or not fully cured blanks for compression mouldings: (f) Other type	Free	Free
904 Synthetic resin compositions, n.o.p.	15 p.c.	15 p.c.
907 Foamed and expanded synthetic resins, in logs, sheets, blocks or boards, or in flakes, granules or powder	15 p.c.	20 p.c.

Under the Brussels Tariff Nomenclature, the polyurethane resins and foams, and also the prepolymers (polyesters or polyethers) which are polymerized macro-molecules, are classified by heading 39.01. This would include most of the forms now classified in the Canadian Customs Tariff as rubber or waste. Heading 39.01 would not apply to finished products made of polyurethane resin or foam, nor to certain resins in solvents. Any resin in solvent where the solvent exceeds 50 per cent by weight of the mixture is excluded from 39.01 and falls under heading 32.09, which pertains to varnishes, lacquers, paints and similar products; those not containing more than 60 per cent by weight of solvent are now classified under tariff item 901(c). At the hearing it was also suggested that non-resin components of the "two-package" systems would probably be under heading 38.19 as mixtures of chemicals. If such components were single chemicals, they would fall under the appropriate headings of Chapter 29. Similarly, a package importation of the ingredients of the "one-shot" system would probably fall under 38.19; if the components were imported separately, each would be classified according to the appropriate heading. Except as indicated below, the proposals received by the Board did not take into account any

(1) Tariff Board Declaration A-576, (Appeal No. 636), dated January 30, 1963

problems of classification under the B.T.N., nor did they attempt to exclude any forms not within the scope of the Reference.

The Canadian producers all requested, under heading 39.01, that rates of 15 p.c., B.P. and 20 p.c., M.F.N., be applied to the forms in which they are interested. Naugatuck's request related to prepolymer systems for rigid polyurethane foam, Monsanto's to both rigid and flexible polyurethane foam and Reichhold's to oil-modified polyurethane resins.⁽¹⁾

On the other hand, the consumers or importing agents, with one exception, proposed free entry or no change in the present tariff status for forms not made in Canada until such time as there is Canadian production. Naugatuck Chemicals made such a request for polyurethane liquid casting resins which, it was suggested, could be differentiated from other forms on the basis of the percentage by weight of free diisocyanate. Free entry was also requested by Schenectady Chemicals for the polyurethane prepolymers it uses in the manufacture of electrical insulating materials,⁽²⁾ by A.S. Paterson Company Limited for the rigid foam and prepolymer systems based on hexachloroendomethylenetetrahydrophthalic acid,⁽³⁾ and Minnesota Mining and Manufacturing Company of Canada Limited for polyurethane resin in lumps, powders, granules, flakes, liquids or pastes.⁽⁴⁾ Dynaflex Plastics Limited objected to any change in the duties applicable to flexible polyurethane (polyether type) prepolymers until such time as the materials are produced in Canada.⁽⁵⁾

The Canadian Pulp and Paper Association, in its general brief to the Board on chemicals used by the pulp and paper industry, objected to any revisions which would increase the costs of the industry.⁽⁶⁾ Polyurethane resins, used for coatings compounds, were included in the list of chemicals used by the industry.⁽⁷⁾

In summary, there were a number of proposals for free entry for forms of the products not made in Canada. As both rigid and flexible foams are made in Canada, duties were requested on these, although the A.S. Paterson proposal suggested that the special fire-retardant properties of the rigid foam with which it was concerned might entitle it to special treatment. This claim for unique properties was disputed by Naugatuck Chemicals. In any case, the imported product is usually, if not always, in the form of two-package systems for the production of the foam; these probably are more properly considered as part of an item worded like heading 38.19.

With respect to prepolymer systems for rigid foams, the Naugatuck proposal for duties was based on Canadian production. As indicated above, the company disputed the claims made for the imported product of the Paterson brief. The two-package prepolymer systems for flexible foam with which Dynaflex was concerned were not produced in

(1) Transcript, Vol. 130, p. 19454, 19496 and Vol. 126, p. 18860 respectively

(2) Same, Vol. 127, p. 18931-2

(3) Same, Vol. 131, p. 19531, 19555

(4) Same, Vol. 162, p. 24086-7

(5) Same, Vol. 130, p. 19522-3

(6) Same, Vol. 36, p. 5246-7

(7) Same, Vol. 129, p. 19360

Canada, but Monsanto objected to special provision for these on the ground that it would provide an unfair advantage to those using the two-package system as opposed to firms such as Monsanto which make flexible foam directly from the raw materials and by-pass the prepolymer stage. Many of the raw materials, it was said, either were or were likely to become dutiable at the same rates as proposed for foam. Naugatuck also suggested that these systems are not made in Canada because of lack of adequate protection,⁽¹⁾ although this does not appear to have inhibited the company's production of prepolymer systems for rigid foams.

The rates requested for flexible and rigid polyurethane foam, namely 15 p.c., B.P. and 20 p.c., M.F.N., are the same as those applicable since 1958 to those foams classified under tariff item 907. Monsanto claimed that the cessation of free entry for foam at that time had enabled the Canadian producers to overcome their early difficulties in establishing the industry in Canada. Although the company makes only flexible foam, its proposal applied to both forms, because of similarities in the method of manufacture.

Monsanto also stated that the nature of the foaming process and consumers' requirements necessitate the operation of relatively large foaming units which, at the current level of demand, are operated at a lower percentage of capacity, with higher costs, than similar units in the United States. While increasing demand will decrease this disparity, the reduction could be offset by increased costs of raw materials if goods now imported free of duty are subjected to duties as proposed by some Canadian manufacturers. The duty was said to be needed, therefore, to equalize differences in production costs, to offset possible increases in rates of duty on materials and to ensure that the growing market is available to Canadian producers. There would then also be an increased demand for the products of the Canadian petrochemical industry.

Both Naugatuck Chemicals and Reichhold drew attention to the existing rates and to those proposed for the principal raw materials.⁽²⁾ Naugatuck stated that 60 to 70 per cent of the cost of its polyurethane systems was represented by the cost of raw materials.

Those advocating free entry for various forms of the products, or no change in the present rates, did so largely on the grounds that, because there was no Canadian production of the required materials, any duties or any upward change would impose higher costs on Canadian consumers and weaken their position in relation to competitive products made from other materials.

Polyurethane Non-Textile Monofilaments

Another form of polyurethane mentioned briefly to the Board was polyurethane synthetic bristles, which, it is understood, are not produced in Canada.

⁽¹⁾ Transcript, Vol. 130, p. 19524

⁽²⁾ Same, Vol. 126, p. 18863; Vol. 130, p. 19478-9

Mr. Lacy Falk, of Montreal, as importing agent for Farben-fabriken Bayer A.-G., West Germany, requested that there be no change in the tariff provision for these products,⁽¹⁾ now dutiable at 15 p.c., B.P., and 15 p.c., M.F.N., as "synthetic resin ... non-textile monofilament; ... not further manufactured than moulded, cast, calendered, extruded or pressed" under tariff item 906(e). This request was opposed by Du Pont of Canada Limited, which claimed that this product is directly competitive with the nylon monofilament which it produces in Canada.⁽²⁾ Du Pont urged that this product be subject to the rates recommended by the company for all monofilaments. The Du Pont proposal and the problem of classification are discussed more fully in this section of the report, under the polyamides.

EPOXY RESINS

Epoxy resins are thermosetting materials produced by condensation from the reaction of epichlorohydrin with a polyhydroxy compound, usually Bisphenol A, in the presence of a catalyst. Other diphenols, such as tetrachlorobisphenol A, bisphenol F, phenolic novolacs and long chain bisphenols from cashew nut oil, may be used. Epoxy resins vary in form from viscous liquids to brittle solids and in colour from colourless to amber.

Like phenolic resins, epoxies may contain a phenol, but they differ chemically in that they require the addition of curing agents to become thermosetting and to form tough, non-fusible solids. Equipment similar to that used in the production of phenolics is used to make epoxies, appropriately modified for the more complex operation of producing the latter.

Their exceptional adhesive properties, excellent chemical resistance and electrical properties and their low shrinkage on cure make epoxy resins particularly suitable for use in the production of surface coatings and adhesives, for the potting and encapsulation of electrical components and in the manufacture of both low and high pressure laminated products. More specifically, epoxies are used in automotive primer coatings, can linings, appliance enamels, electrical varnishes and maintenance finishes; they also are useful in concrete patching, water-proofing and anti-skid coatings on roads and passageways. Epoxy adhesives will stick almost anything anywhere and are used for brake linings, aircraft and electronic parts and to join metals. As binders, they are used in fibreglass mouldings for military equipment, boat parts and replacement fenders. A spokesman for one of the Canadian producers stated that, for reasons of price, epoxies are only used when their superior qualities are required for particular applications.⁽³⁾

Epoxy resins are produced for sale by the Shell Chemical Division of Shell Oil Company of Canada Limited, at Montreal, Quebec and by Union Carbide Canada Limited, Bakelite Division, Belleville, Ontario. Shell was reported to have commenced production of resins in

(1) Transcript, Vol. 174, p. 28551

(2) Same, Vol. 174, p. 28553

(3) Same, Vol. 125, p. 18753

solid form in 1958, while Union Carbide began production of liquid resins in 1961.⁽¹⁾ Reichhold Chemicals (Canada) Limited, Toronto, Ontario, produces epoxy esters — resins in organic solvents — for use by the paint industry and as a floor varnish and floor enamel vehicle. In addition, some paint companies produce epoxy resins for their own use.

The Board has not collected directly much information on the Canadian market for epoxy resins; a trade publication has estimated the market as follows, in addition to which there seems to be about two million pounds of captive production.

Production, Imports, Exports and Consumption of Epoxy Resins, 1956-64
(on net resin dry basis, except surface coatings)

	<u>Commercial Production</u>	<u>Imports</u>	<u>Exports</u>	<u>Apparent Domestic Commercial Consumption</u>
		- '000 pounds -		
1956	-	600	-	600
1957	-	650	-	650
1958	600	150	-	750
1959	900	500	small	1,400
1960	1,100	200	small	1,300(a)
1961	1,650	650	small	2,300
1962	2,300	650	450	2,500
1963	2,400	2,000	1,200	3,200
1964	2,600	2,000	1,200	3,400

(a) Omits 300,000 pounds of imported epoxy formulations

Source: Canadian Plastics, various issues

There is also a breakdown of this consumption by uses.

Canadian Consumption of Epoxy Resins, 1958-64

	<u>Protective Coatings</u>	<u>Adhesives & Specialties</u>	<u>Plastics: Moulding & Electrical</u>
		- '000 pounds -	
1958	500	-	250
1959	900	250	250
1960	950	350	300
1961	1,600	400	300
1962	1,700	500	300
1963	2,100	700	400
1964	2,200	780	420

Source: Canadian Plastics

(1) Transcript, Vol. 125, p. 18732, 18759

In its submission to the Board, Union Carbide estimated that the Canadian market in 1961 took 2.2 million pounds of which 1.3 million were domestically produced. It was stated that the market for the products is principally in Ontario and Quebec, and that exports at that time were negligible.⁽¹⁾ The data in the previous table indicate that exports have since become a substantial outlet for production.

An indication of the increasing use of epoxy resins in Canada can be found in the statistics published by D.B.S. for the consumption of epoxies by the paint, varnish and lacquer industry.

Epoxy Resins Consumed by Paint and Varnish Manufacturers, 1957-63

	<u>'000 lb.</u>	<u>\$'000</u>	<u>Average Value</u> <u>¢/lb.</u>
1957	448	277	62
1958	481	275	57
1959	778	361	46
1960	1,181	548	46
1961	1,623	657	41
1962	1,664	915	55
1963	2,270	1,228	54

Source: D.B.S., Cat. No. 46-210

No official statistics are published for exports of epoxy resins; for imports there has been a separate classification only since January 1, 1963.

Imports of Epoxy Resins, 1963 and 1964

	<u>1963</u>			<u>1964</u>		
	<u>'000 lb.</u>	<u>\$'000</u>	<u>Average Value</u> <u>¢/lb.</u>	<u>'000 lb.</u>	<u>\$'000</u>	<u>Average Value</u> <u>¢/lb.</u>
United Kingdom	122	35	29.0	114	45	39.8
West Germany	1	1	106.8	2	1	25.2
United States	<u>2,156</u>	<u>1,331</u>	<u>61.7</u>	<u>2,098</u>	<u>1,366</u>	<u>65.1</u>
Total	2,278	1,367	60.0	2,214	1,412	63.8

Source: D.B.S., Trade of Canada, Imports

⁽¹⁾ Transcript, Vol. 125, p. 18739-40

Published prices of Canadian-made epoxy resins are not available. In the U.S.A., prices have been relatively stable in recent years, ranging from a low of 28½ cents per pound for certain epoxy esters to \$1.55 per pound for epoxy moulding powders.⁽¹⁾

Another form of plastics product which utilizes epoxy resins and covered by heading 39.01 is laminated plastic sheets. These consist of resins, such as phenolic, epoxy or amino-aldehydes, usually in organic solvents, and fillers such as absorbent rags, alpha-cellulose paper, kraft paper, asbestos, and cotton, glass and synthetic fabrics. The sheets, for special purposes, may be surfaced with metal or rubber. They are produced by impregnating and coating a web of the filler by passing it through a bath of the resin solution and then through a heated oven where the solvent is evaporated and the resin further reacted to a point suitable for moulding. The impregnated product is assembled in layers and subjected to heat and pressure to fuse the material into a dense, solid mass in the form of sheets, tubes or other shapes.

Epoxy laminates, owing to their extremely low moisture absorption, are valuable in applications where the laminate must retain its electrical and mechanical properties under conditions of high humidity. These products also possess high tensile, compressive strength, high impact and heat resistance and superior bond strength and are resistant to all but the strongest acids, caustics and solvents. Epoxy laminates are used for printed electrical circuits and other applications where their properties make them particularly useful.

Tariff Considerations

Epoxy resins are not specifically provided for in the existing Customs Tariff. The products mentioned by Union Carbide as applicable to epoxy resins and laminates are:

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
901(a) Synthetic resins without admixture, including scrap or waste:		
9. Other type	Free	Free
(b) Synthetic resins in the form of aqueous emulsion, aqueous dispersions or aqueous solutions, without admixture:		
8. Other type	Free	Free
(c) Synthetic resins in organic solvents where the solvent is not more than 60 per cent by weight, without other admixture:		
5. Other type	10 p.c.	10 p.c.

⁽¹⁾ Chemical and Engineering News, various issues

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>		
902	Synthetic resins, compounded with other materials, in any form, including scrap or waste, for moulding, coating, extruding, calendering, pressing, (moulding compositions or materials for processing into moulding compositions); synthetic resins compounded with other materials in the form of not fully cured preforms or not fully cured blanks for compression mouldings: (f) Other type		Free	Free
903	Synthetic resin glues or adhesives, composed of synthetic resins compounded with other materials		15 p.c.	17½ p.c.
904	Synthetic resin compositions, n.o.p.		15 p.c.	15 p.c.
905	Synthetic resin plates, sheets, film, sheeting or strips, not less than 6 inches in width, n.o.p.; synthetic resin lay-flat tubing, not less than 6 inches in circumference, n.o.p.:— (f) Other type: 1. Plain, uncoated, undecorated		Free	Free
906	Synthetic resin plates, sheets, film, sheeting or strips, less than 6 inches in width, lay-flat tubing less than 6 inches in circumference, other tubing, blocks, bars, rods, non-textile monofilament; synthetic resin profile shapes produced in uniform cross-section and imported in lengths; not further manufactured than moulded, cast, calendered, extruded or pressed, n.o.p.:— (e) Other type		15 p.c.	15 p.c.
907	Foamed and expanded synthetic resins, in logs, sheets, blocks or boards, or in flakes, granules or powder		15 p.c.	20 p.c.
916	Laminated moulded plastics products, n.o.p., having synthetic resins or cellulose plastics as the chief bonding (impregnating) agents		15 p.c.	15 p.c.

Item	British Preferential Tariff	Most- Favoured- Nation Tariff
917 Reinforced or supported synthetic resin or cellulose plastics plates, sheets, sheeting, strips, tubing, blocks, bars, rods, in which is incorporated a layer of paper, fibre-board, or textile fabric, or a core of fibres whether matted or otherwise arranged, n.o.p.:-(b) Other	15 p.c.	15 p.c.

The Shell Oil Company of Canada Limited made no submission to the Board on epoxy resins. The Bakelite Division of Union Carbide Canada Limited made a single submission covering phenolic and epoxy resins and laminates, the products of heading 39.01 produced by that Division. The only submission relating solely to epoxies came from CIBA Company Limited which supplies epoxy resins imported from the United States. Epoxy resins were also mentioned in two general briefs, one from Reichhold Chemicals (Canada) Limited on the various resins and plastics produced by the company and one from Minnesota Mining and Manufacturing of Canada Limited relating to a wide range of plastics materials used by or produced by that firm.

In the Brussels Tariff Nomenclature, almost all the forms of epoxy resins admissible under the tariff items cited above, and of interest to those making submissions to the Board, would be classified under heading 39.01. Any resins in organic solvent would, however, be excluded from this heading and fall under heading 32.09 which refers to varnishes, lacquers and paints, if the weight of the solvent exceeds 50 per cent of the weight of the mixture. Tariff item 901(c)5, however, provides for products if the solvent does not exceed 60 per cent of the total weight. Epoxy glues, now entered under item 903, would fall under heading 35.06 if put up for retail sale in packages not exceeding a net weight of one kilogramme. Laminates consisting of layers of paper or textile, impregnated with artificial resins and compressed together, are considered to be plastics by the B.T.N. if they have a hard, rigid character; if they have more the character of paper or textile, they are classified as such elsewhere in the Nomenclature.

Union Carbide Canada Limited, Bakelite Division, a manufacturer of epoxy resins, requested they be dutiable at rates of 15 p.c., B.P. and 20 p.c., M.F.N.(1) Reichhold Chemicals stated that it was in substantial agreement with these proposed rates and its spokesman said that on the resins made by the company a reasonable rate would be 20 per cent, M.F.N.(2)

(1) Transcript, Vol. 125, p. 18742

(2) Same, Vol. 126, p. 18886

CIBA Company Limited proposed that the tariffs on epoxy resins (and also the curing agents of B.T.N. heading 38.19) not be increased. This referred particularly to the free entry for resins under item 901(a)9 and for curing agents under item 921 and to the 10 p.c. rate under both the B.P. and M.F.N. Tariffs for resins in solvents, under tariff item 901(c)5.⁽¹⁾ It has been reported that CIBA plans to make certain epoxy resins in Canada.

Minnesota Mining and Manufacturing included in its list of resins not produced in Canada for which free entry was requested until made in Canada, "epoxy resins in lumps, powders, granules, flakes, liquids or pastes."⁽²⁾ Subsequent to the hearings, this request was withdrawn by letter to the Board.

The Union Carbide case for the proposed rates of duty was largely based on the phenolic part of the company's operations. The company claimed that tariff protection was necessary to ensure the existence of a Canadian source of supply and service in periods of shortages and to insulate Canadian producers from fluctuations abroad not reflected in domestic raw material costs and other costs. The Canadian producers also were said to require the largest possible share of the domestic market to finance process and product development. It was pointed out that the temporary surcharge on imports, at the time of the hearing, and the change in the exchange rate had improved the company's position without any increase in price.

Union Carbide also suggested that the rates requested are reasonable and comparable to those applying to, or requested for, its raw materials. In this connection it will be noted that Bisphenol A (heading 29.06) is currently dutiable at 15 p.c., B.P. and 20 p.c., M.F.N., under tariff item 711, and that the Canadian producer requested continuation of these rates; epichlorhydrin (heading 29.09), for use in the manufacture of epoxy resins, is duty-free under both Tariffs, under tariff item 921, and both Canadian producers of epoxies requested continuation of this free entry until such time as the product is made in Canada.

Reichhold Chemicals advanced similar arguments concerning the effect on the market of import surcharges and the change in the exchange rate and also the comparison of the rates on raw materials and on the finished products.

CIBA suggested that any increase in the rates on epoxy resins would hamper the development of new formulations and new applications for the product by discouraging investment in research and restricting the market to those companies now producing in Canada and to the products now made here. It would reduce the access of Canadian consumers to research carried on outside the country, often with Canadian applications in mind. The company claimed that its U.S. research and production facilities were adequate for the entire North American market and that it produced a wider range of epoxies than either of the Canadian producers. Duties, it was suggested, would increase the cost to the Canadian consumers of essential raw materials.

⁽¹⁾ Transcript, Vol. 133, p. 19902, 19906, 19909

⁽²⁾ Same, Vol. 162, p. 24086-7

SILICONES

The silicones of B.T.N. heading 39.01 are described in the Explanatory Notes to the B.T.N. as non-chemically defined products containing in the molecule more than one silicon-oxygen-silicon linkage, and also containing organic groups connected to the silicon atom by direct silicon-carbon bonds. Chemically, they are organo-polysiloxanes, semi-organic polymers. The organic groups are usually methyl, phenyl or vinyl radicals, but a wide variety of other groups, such as fluoro-alkyls, may be substituted to gain particular properties. The types of organic groups, together with the extent of any cross-linkage between polymer molecules, help to determine the physical form of the silicones, which may be liquid, semi-liquid or solid. The products, which have a high stability, are variously known as silicone oils, greases, resins, fluids and "rubber". In the field of synthetic resins, silicones are unusual in that the structural unit is a silicon rather than a carbon atom.

Although the different types and forms of silicones have widely varying properties, the more commercially valuable products are characterized by certain outstanding properties: their resistance to heat and to the effects of weather and oxidation; their water repellency; their excellent electrical properties such as low loss factor, low dielectric constant and high arc resistance; and, for use as release agents, their incompatibility with most organic polymers.

Silicone resin is not produced in Canada; Canadian production is limited to the compounding or fabrication of imported materials. Because of patent restrictions, the U.S.A. is virtually the sole supplier of the Canadian market;⁽¹⁾ there are three integrated producers in the U.S.A. These firms make the monomers -- the organic silicon compounds of heading 29.34, the crude mixtures or hydrolysates which are probably classed as resins under 39.01, and also the resins and other forms of heading 39.01. These three companies, Dow Corning Corporation, General Electric Company and Union Carbide Corporation, all have Canadian subsidiaries which import and distribute their silicone products in Canada. A fourth U.S. firm, Stauffer Chemical Company, is expected to have on-stream a silicone plant at Adrian, Michigan, in April 1965.⁽²⁾

Little statistical information is available concerning Canadian consumption of silicones. A trade publication estimated the market in 1962 to be 1.5 million pounds,⁽³⁾ which would have a value of over \$4 million. This quantity included approximately 100,000 pounds of silicone "rubber", the use of which was said to have increased annually by 20 per cent in the two preceding years. It was also suggested by this publication that Dow Corning was planning the construction of a silicones plant at Niagara Falls, Ontario.

(1) Transcript, Vol. 132, p. 19823

(2) Oil, Paint and Drug Reporter, November 16, 1964, Vol. 186, No. 20, p. 45

(3) Rubber and Plastic Processing, Mar./Apr. 1963, Vol. 1, No. 1, p. 11, 12

Although the publication suggested that silicones in Canada were principally used as surface coatings, the submissions received by the Board indicated a wide variety of applications by a number of industries. In a joint brief from the three Canadian subsidiaries of the U.S. producers, Canadian General Electric Company Limited, Dow Corning Silicones Limited and Union Carbide Canada Limited, it was stated that "silicones serve virtually all industries to a greater or lesser extent and for one purpose or another."⁽¹⁾ The brief indicated that various forms of silicones are used in the textile, petroleum, chemical, machinery, metal, motor vehicle, food, paper, electrical, fabricated products, stone, clay and glass, concrete, rubber products, wood products, transportation, instrument, printing, leather, construction, mining and other industries.

Armet Industries Limited, Guelph, Ontario, appeared as a purchaser of imported silicones from which it produces silicone compounds for captive use and for sale, and also fabricated silicone products both for the domestic market and for export. It has recently been announced that this company has been purchased by Dow Corning A.G., Zurich, Switzerland, and that it will continue its present line of production for the domestic market only, with marketing and distribution to be handled by Dow Corning Silicones Limited, Toronto.⁽²⁾

Silicones were also mentioned in submissions from five associations. The Canadian Textiles Institute indicated that the textile industry requires annually silicone emulsions to the value of \$300,000 to \$500,000 for use to provide water-repellent fabric finishes and as anti-foam agents in processing.⁽³⁾ Members of the Canadian Manufacturers of Chemical Specialties Association use methyl silicone fluids (dimethyl polysiloxanes) in the manufacture of automotive, furniture and specialty polishes.⁽⁴⁾ The Canadian Paint Varnish and Lacquer Association stated that the paint industry consumes, in the production of heat-resistant finishes, silicone resins to the value of about \$50,000 annually.⁽⁵⁾ The Canadian Pulp and Paper Association included in a list of products of interest to the industry, silicones used as defoamers and coaters and to impart grease resistance.⁽⁶⁾ The Canadian Pharmaceutical Manufacturers Association included silicone fluids in a list of chemicals used by any member of the Association to the extent of \$1,000 or more per annum.⁽⁷⁾ The first three Associations mentioned above also indicated that, for the uses to which the products are put, there are no satisfactory substitutes. They tended to agree with the importers' contention that, because of expense, substitutes would be used if any were available.⁽⁸⁾

(1) Transcript, Vol. 132, p. 19805

(2) Canadian Chemical Processing, November 1964, p. 9

(3) Transcript, Vol. 163, p. 24180

(4) Same, Vol. 148, p. 22057

(5) Same, Vol. 133, p. 19891; Vol. 174, p. 28531

(6) Same, Vol. 129, p. 19360

(7) Same, Vol. 87, p. 13278, 13312

(8) Same, Vol. 133, p. 19841

Tariff Considerations

In the existing Canadian Tariff, there is no specific provision for any of the silicone products of interest to the parties making representations to the Board. In addition to such general tariff items as 208t, 220a, 711, 851 and 921, a number of other items were mentioned in the various submissions as applicable to silicones in the forms classified by B.T.N. heading 39.01.

<u>Item</u>		<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
203a	Chemical compounds composed of two or more acids or salts soluble in water, adapted for dyeing or tanning.....	Free	Free
249	Varnishes, lacquers, japans, japan driers, liquid driers and oil finish, n.o.p. per gallon and	15 cts. 5 p.c.	15 cts. 15 p.c.
*272a	Petroleum greases and lubricating greases, n.o.p.	12½ p.c.	15 p.c.
*616(1)	Rubber, crude, caoutchouc or India-rubber, unmanufactured, n.o.p.	Free	5 p.c.
*618	Rubber cement and all manufactures of rubber and gutta percha, n.o.p.	15 p.c.	20 p.c.
901	(a) Synthetic resins without admixture, including scrap or waste: 9. Other type	Free	Free
	(b) Synthetic resins in the form of aqueous emulsions, aqueous dispersions or aqueous solutions, without admixture: 8. Other type	Free	Free
	(c) Synthetic resins in organic solvents where the solvent is not more than 60 per cent by weight, without other admixture: 5. Other type	10 p.c.	10 p.c.

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most Favoured- Nation Tariff</u>		
902	Synthetic resins, compounded with other materials, in any form, including scrap or waste, for moulding, casting, extruding, calendering, pressing, (moulding compositions or materials for processing into moulding compositions); synthetic resins compounded with other materials in the form of not fully cured preforms or not fully cured blanks for compression mouldings: (f) Other type		Free	Free
903	Synthetic resin glues or adhesives, composed of synthetic resins compounded with other materials	15 p.c.	17½ p.c.	
904	Synthetic resin compositions, n.o.p.	15 p.c.	15 p.c.	
916	Laminated moulded plastics products, n.o.p., having synthetic resins or cellulose plastics as the chief bonding (impregnating) agents	15 p.c.	15 p.c.	
917	Reinforced or supported synthetic resin or cellulose plastics plates, sheets, sheeting, strips, tubing, blocks, bars, rods, in which is incorporated a layer of paper, fibreboard, or textile fabric, or a core of fibres whether matted or otherwise arranged, n.o.p.:— (b) Other	15 p.c.	15 p.c.	

* Not part of Reference 120

Silicone resins covered by the tariff items listed above would fall principally under heading 39.01 of the B.T.N. There are, however, certain exceptions: resins in solvents where the weight of the solvent exceeds 50 per cent by weight of the solution (all silicones under tariff item 249 and some under 901(c)5) would be classified with varnishes, lacquers and paints under heading 32.09; certain lubricating preparations containing silicone greases or oils (tariff item 272a) would fall under B.T.N. headings 27.10 and 34.03; any resins suitable for use as glues, put up for sale by retail as glues, in packages not exceeding a net weight of one kilogramme are classified by heading 35.06.

The various submissions on silicones received by the Board did not differentiate in detail between those forms now admitted under items within the Board's terms of reference and those admitted under other items. Although, generally speaking, the submissions related to heading 39.01 of the Brussels Tariff Nomenclature, there was also some discussion of heading 32.09 in relation to these products. There was little or no discussion of the relevance of headings 27.10, 34.03 and 35.06.

The Canadian subsidiaries of the U.S. silicone producers, which import from their parent companies and distribute the products in Canada, proposed that there be provided, until such time as there is Canadian production, free entry, under both the B.P. and M.F.N. Tariffs, for:

1. Silicone fluids of less than 1,000,000 centistokes viscosity, with or without admixture;
2. Silicone fluids (including gums) of over 1,000,000 centistokes viscosity, with or without admixture;
3. Silicone resins with or without admixture; and
4. Silicone organic copolymers with or without admixture.

The companies suggested that these be listed as exceptions to the rates provided for headings 32.09 and 39.01.⁽¹⁾ They made no firm proposal as to the rates that should be applicable if the products come to be made in Canada.

Armet Industries Limited proposed an item under B.T.N. heading 39.01:

	<u>B.P.</u>	<u>M.F.N.</u>
"39.01A Silicone "Rubber"		
Silicone "rubber" gum stock without admixture	0 p.c.	0 p.c.
Silicone "rubber" compounds, not in solution	5 p.c.	5 p.c.
Further manufactured and/or fabricated parts	15 p.c.	20 p.c."

In explanation, the spokesman for the company indicated that the proposal for compounds would require a subdivision of the importers' proposal.⁽²⁾ The proposals for gum stock and compounds, in reference to heading 39.01, would apply to the forms described in Brussels Nomenclature Chapter 39, Chapter Note 3(b) — blocks, lumps, powders, granules, flakes and similar bulk forms; the proposal for further processed forms would apply to those in 39.01 described by Chapter Note 3(c) such as seamless tubes, rods, sticks and profile shapes and also to the silicone products of 39.07.

(1) Transcript, Vol. 132, p. 19806-7

(2) Same, Vol. 133, p. 19853, 19864

The Canadian Textiles Institute proposed free entry, until made in Canada, for "Silicone emulsions for use in textile finishing." It was stated that this proposal should cover emulsions including the necessary catalysts, stabilizers and emulsifying agents. The Institute indicated that it would not object to the application of the proposed heading rates for 39.01 if the emulsions come to be made in Canada.⁽¹⁾

The Canadian Paint Varnish and Lacquer Association proposed an exception under heading 39.01 to provide for free entry for silicone resins as long as they are not made in Canada.⁽²⁾ The Association objected to the proposed inclusion of the four items proposed by the importers under heading 32.09. It made no proposals as to the rates that should be applicable if silicone resins come to be made in Canada.

The Canadian Pulp and Paper Association made no proposal relating specifically to the silicones used by its members, but objected to any increase in the rates of duties pertaining to chemicals used in the industry.⁽³⁾

The Canadian Pharmaceutical Manufacturers Association proposed, for chemicals (including silicone fluids) used in pharmaceuticals, that they be dutiable at rates of Free, B.P., and 15 p.c., M.F.N., until made in Canada and at rates of 15 p.c., B.P., and 20 p.c., M.F.N., when made in Canada.⁽⁴⁾ The proposal for an end-use item was modified by including a statement that it should apply only to chemicals not otherwise provided for.

The Canadian Manufacturers of Chemical Specialties Association proposed free entry under heading 39.01 for silicones as products not made in Canada and until such time as they become commercially available in Canada; if the products should be made in Canada, the Association would "go along with the 15 and 20 per cent rate."⁽⁵⁾

Paisley Products of Canada Limited, while giving no particulars as to the company's use of silicones or reasons for the proposal, recommended that silicones, as an exception to the company's proposed rates for heading 39.01, be free of duty under both the B.P. and M.F.N. Tariffs.⁽⁶⁾

The various proposals, made in terms of B.T.N. headings, took little account of the fact that, as estimated by one of the importers, some 25 per cent of the silicones now imported are classified under items not within the Board's terms of reference.⁽⁷⁾ This includes all the products of interest to Armet Industries which are considered, in the administration of the Customs Tariff, to fall into items in the rubber Schedule. The Board received no proposals as to how any tariff provision for silicones might be framed to exclude those forms not within its terms of reference.

(1) Transcript, Vol. 163, p. 24151, 24176

(2) Same, Vol. 133, p. 19891

(3) Same, Vol. 85, p. 13005

(4) Same, Vol. 87, p. 13321

(5) Same, Vol. 148, p. 22065

(6) Same, Vol. 123, p. 18488

(7) Same, Vol. 133, p. 19840

At the public hearing, the representative of the Canadian Paint Varnish and Lacquer Association opposed the importers' request that exceptions be provided for silicones under heading 32.09, on the grounds that items worded as proposed would make possible the free importation of paints containing silicones. It was made clear that the proposal had been made because the importers do bring in silicones in organic solvents where the solvent is more than 50 per cent by weight of the mixture. Following discussions between the interested parties, it was indicated to the Board that two of the importers were prepared to withdraw their request under 32.09; the third was not. Another suggestion was that the provision under 32.09 might be limited to products "for further manufacture", in order to prevent the importation of products which might be used directly as paints. As the indication at the hearing was that the importers are not concerned with any product containing less than 33 per cent by weight of silicones, it was also suggested that the problem might be met by altering the criterion under 39.01 to silicones containing not more than 70 per cent by weight, of organic solvents, or by putting such a limitation on the exception proposed to heading 32.09.(1)

The proposals for free entry for the various forms of silicones were based on their not being made in Canada and the lack of suitable Canadian-made substitutes. Armet Industries' proposals were designed to provide the company with an additional margin on the products made in Canada from expensive imported materials.

OTHER RESINS OF HEADING 39.01

In addition to those resins discussed separately, a number of other products of heading 39.01 came to the attention of the Board. There were submissions on a number of these, including goods described as alkali-soluble resins, a terpene resin of the polyester type, furfural resins, cashew nut shell oil resins, resorcinol-formaldehyde resins and also binders for pigments and inks used in the coating, colouring or printing of textiles. In addition, reference was made to polycarbonates and polyethers. Of these various resins, the alkali-soluble group received most discussion; the interests in the other types are noted below after Tariff Considerations on the alkali-soluble resins.

Alkali-Soluble Resins

The products called alkali-soluble resins were said to be derived from tall-oil or natural resins, modified further than provided for under heading 39.05, and used in the production of waxes as leveling agents or to impart hardness, gloss and anti-slip properties to wax film.(2) Another group of resins derived from natural resins or tall oil was said to be imported for use in the production of adhesives, lacquers, inks, paints and varnishes. These were described as maleic-modified resin esters, modified pentaerythritol esters of rosins, alcohol and alkali soluble resins, alcohol soluble modified esters of rosin, pentaerythritol derived, heat reactive resin intermediates,

(1) Transcript, Vol. 133, p. 19856-8

(2) Same, Vol. 127, p. 18942, 18964; Vol. 148, p. 22058

internally plasticized pentaerythritol esters of rosin, and rosin derived elastomeric resins, one of which is supplied as 50 per cent solids in diisooctyl phthalate.

Certain alkali-soluble resins are produced at Toronto by Schenectady Chemicals Canada Limited; Reichhold Chemicals Canada Limited, Toronto, Ontario, advised the Board that it was about to commence production of certain products in this field of resins derived from natural resins. The Canadian Manufacturers of Chemical Specialties Association made representations on behalf of its members who use both Canadian and imported alkali-soluble resins in the production of waxes. Harrisons & Crosfield (Canada) Limited made a submission concerning a variety of these resins imported from Hercules Powder Company in the United States. This submission was mentioned previously with respect to the phenoplasts of heading 39.01.

Little statistical information is available concerning these resins. Schenectady estimated that about 50 per cent of the market in which the company is interested was being supplied by imports.⁽¹⁾ Imports are classified by the D.B.S. with those of other resins derived from natural resins and tall oil, many of which would fall under B.T.N. headings 38.08 and 39.05. The total of such imports in 1963 and 1964 was about 12 million pounds, valued at nearly \$3 million, all from the United States.

Tariff Considerations

The principal tariff items now applicable to alkali-soluble resins are as follows:

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
901(a) Synthetic resins without admixture, including scrap or waste:		
7. Resins derived from natural resins or tall oil, n.o.p.	Free	Free
(b) Synthetic resins in the form of aqueous emulsions, aqueous dispersions or aqueous solutions, without other admixture:		
7. Resins derived from natural resin or tall oil, n.o.p.	Free	Free
(c) Synthetic resins in organic solvents where the solvent is not more than 60 per cent by weight, without other admixture		
4. Resins derived from natural resin or tall oil, n.o.p.	12½ p.c.	12½ p.c.
904 Synthetic resin compositions, n.o.p.	15 p.c.	15 p.c.

⁽¹⁾ Transcript, Vol. 127, p. 18973

Some general observations are in order concerning these tariff items. A number of the products dutiable under items 901(a)7, 901(b)7 and 901(c)4 could be classified in the B.T.N. by headings 38.08 and 39.05; there also is the possibility that item 901(c)4 would cover goods of B.T.N. heading 32.09 if these were in mixtures containing more than 50 per cent by weight of solvent.

Schenectady Chemicals proposed that all resins now imported under tariff item 901(a)7 be considered to be of a class or kind made in Canada, as they are chemically similar to, and manufactured with essentially the same equipment as, the company's products. The company proposed rates of 15 p.c., B.P., and 20 p.c., M.F.N. for these products. The company suggested that its proposals would increase the sales of Canadian-made products, that rates on raw materials should not be higher than those on goods made from the raw materials and that these rates would offset differences in price or imagined differences in quality. The company also suggested that raw material costs and labour costs per pound of output are lower in the United States than in Canada.⁽¹⁾

In its brief, which related to a wide range of products, Reichhold Chemicals indicated its agreement, except for phenolic resins for plywood use, with proposals for rates of 15 p.c., B.P. and 20 p.c., M.F.N., for those goods of heading 39.01 produced by or to be produced by the company.⁽²⁾ The proposed rates were said to be essential to the continued growth of the industry, to be required to compel Canadian consumers to evaluate the possibility of substituting Canadian-made materials for U.S. materials in formulations derived from parent companies in the U.S.A. and to offset freight advantages enjoyed by U.S. producers in certain parts of Canada and higher costs of raw materials arising out of higher rates of duties on, or proposed for, raw materials.

Harrisons and Crosfield Limited proposed the maintenance of the current rates on the products it imports until such time as these are available from Canadian production.⁽³⁾ Those here being considered fall under the general description of rosin esters modified with di-basic acids. In the discussion of this submission, it was suggested that some of these might be similar to those produced by Schenectady or to be produced by Reichhold.

The Canadian Manufacturers of Chemical Specialties Association requested that the alkali-soluble resins used in the manufacture of waxes be dutiable at 5 p.c., B.P. and 10 p.c., M.F.N., whether under heading 39.01 or 39.05.⁽⁴⁾ It was suggested that few of the resins are made in Canada and, in particular, that types required for special uses must be imported. The proposed rates would apply only until there is Canadian production, and would give the Canadian producers some protection even if Canadian products could not be used for certain purposes. Imports are from the U.S.A., so that the proposed B.P. rate has little immediate commercial impact.

(1) Transcript, Vol. 127, p. 18933-76

(2) Same, Vol. 126, p. 18862

(3) Same, Vol. 161, p. 23873

(4) Same, Vol. 148, p. 22057

In commenting on the submission by the Canadian Manufacturers of Chemical Specialties Association, a spokesman for the Industry Committee suggested that the term "alkali-soluble resins" was too broad for tariff purposes as it would probably relate to a number of products not contemplated by the Association and also to products which are made in Canada.⁽¹⁾

Terpene Resins

Harrisons and Crosfield also drew to the attention of the Board another product of Hercules Powder Company which was described as a terpene resin of the polyester type, used to impart certain effects to lacquers applied to cellophane films.⁽²⁾ In descriptive literature filed as an exhibit, the product was described as an alkyd derived from terpene polybasic acid, 75 per cent solids in toluene. This product, which differs from the polyterpenes of heading 39.02 and from other polyesters and alkyds, was said to be not produced in Canada and imported from the United States. The company proposed that, until such time as the product is made in Canada, it should continue, under heading 39.01, to be dutiable at rates of 10 p.c., B.P. and M.F.N. as now applicable under item 901(c)5.

Furfural Resins and Cashew Nut Shell Oil Resins

In its general brief to the Board on products of interest to the company, Minnesota Mining and Manufacturing of Canada Limited proposed that free entry be granted for all resins of heading 39.01 which are not produced in Canada until such time as there is Canadian production.⁽³⁾ Among those specifically listed under this provision were furfural resins and cashew nut shell oil resins, in the form of lumps, powders, granules, flakes, liquids or pastes. Cashew nut shell oil resins and furfural resins are specialized products differing from those produced in Canada discussed in the above sections on heading 39.01. The company gave no particulars as to how these products are used. At present, cashew nut shell oil resins, without admixture, are dutiable at $7\frac{1}{2}$ p.c., B.P. and $7\frac{1}{2}$ p.c., M.F.N. under tariff item 901(a)1, when in aqueous emulsion, aqueous dispersion or aqueous solution; without other admixture, at $7\frac{1}{2}$ p.c., B.P. and $7\frac{1}{2}$ p.c., M.F.N., under tariff item 901(b)1, and when in organic solvents where the solvent is not more than 60 per cent by weight, without other admixture, at $12\frac{1}{2}$ p.c., B.P., and $12\frac{1}{2}$ p.c., M.F.N., under tariff item 901(c)1. Furfural resins are dutiable in the Canadian Customs Tariff as "other type", free of duty under both the B.P. and M.F.N. Tariffs, when without admixture, under tariff item 901(a)9, and under tariff item 901(b)8 when in the form of aqueous emulsions, aqueous dispersions or aqueous solutions, without other admixture. When in organic solvents where the solvent is not more than 60 per cent by weight, without other admixture, the rates are 10 p.c. under both the B.P. and M.F.N. Tariffs under item 901(c)5.

(1) Transcript, Vol. 148, p. 22087-8

(2) Same, Vol. 161, p. 23879

(3) Same, Vol. 162, p. 24086-7

Resorcinol-Formaldehyde Resins

The Canadian Pulp and Paper Association, in its general brief opposing increases in rates on chemicals used by its members, listed among such products resorcinol-formaldehyde resins used as waterproofing agents in the manufacture of corrugated board.⁽¹⁾ Under the existing Tariff, these resins are classified under the items applicable to phenol-aldehyde type resins as given in the section of the report on phenoplasts.

Binders for Pigments and Inks

In a general brief on plastics products of interest to its members, the Canadian Textiles Institute drew attention to the duty-free provisions under temporary item 203d for binders for pigments and inks, for use in the coating, colouring or printing of textiles.⁽²⁾ The Institute indicated that the binders are complex formulations, the exact nature of which is unknown to its members, but it is believed that under the B.T.N. they would be classified under headings 39.01 and 39.02. As none of the many varieties used has been offered from Canadian sources, and these goods are imported from the U.S.A., West Germany and Switzerland, the Institute proposed that, under headings 39.01 and 39.02, and any other relevant headings, provision be made for duty-free entry, until made in Canada, of:

Binders for pigments, and binders for inks, for use in the coating, colouring or printing of textiles.

In commenting on the proposal, a spokesman for the Industry Committee suggested that some of the products might fall under Chapter 32, and pointed out the difficulties, without further description, of classifying these products in accordance with the Brussels Nomenclature. Heading 38.19 was also suggested as a possible classification for some of these products.

Polycarbonate Resins

Although no formal proposals were made respecting polycarbonate resins, they were mentioned in at least two submissions. A special survey by the D.B.S. of the statistical class covering imports of synthetic resins, n.o.p., suggested that imports of polycarbonate resins in 1963 were valued at slightly more than \$100,000.

In the course of the discussion of his company's submission on heading 39.01, a spokesman for Canadian General Electric Limited stated that the company considered polycarbonates to be a new class of resins not made in Canada; there was, therefore, no reason to levy any duty on them until they are made in Canada.⁽³⁾ The company offers for sale products made from these resins.

⁽¹⁾ Transcript, Vol. 129, p. 19529

⁽²⁾ Same, Vol. 163, p. 24151

⁽³⁾ Same, Vol. 129, p. 19381

In its submission on photographic base film, Canadian Kodak Company Limited mentioned the existence of polycarbonate base film, but made no proposal concerning tariff treatment.⁽¹⁾

Polyether Resins

This group of products has given rise to many problems of classification both under the existing Canadian Tariff and under the B.T.N. In Canada, many of these resins have been considered to be chemicals rather than plastics, as is borne out by the inclusion in the list of chemicals of a kind made in Canada of such polyethers as polyethylene glycols, polyethylene polypropylene glycols, mono-butyl ethers, polyoxypropylene glycols, polypropylene glycols mono-butyl ethers and polypropylene polyethylene glycols.

In the B.T.N., it is understood that those polyethers which are surface-active agents are classified under heading 34.02; those which have the nature of synthetic waxes are under heading 34.04; other polyethers of very low molecular weight are under heading 38.19 and the others, under 39.01. Examination of the British Tariff bears out these various classifications.

One of the principal uses of polyethers is in the production of polyurethane foam and a number of the proposals for polyurethane prepolymers, recorded in the discussion of polyurethane resins, would, in fact, relate to polyethers.

Although, as indicated above, a number of polyethers have been ruled to be of a kind made in Canada, no manufacturers made proposals specifically for them under B.T.N. heading 39.01. The Rubber Association of Canada, however, on behalf of its members, in a general submission relating to tariff item 208t, listed certain polyethers as being imported under that item and asked for continuation of items for chemicals of a kind not made in Canada, but with free entry under the Most-Favoured-Nation Tariff rather than the existing 15 p.c., M.F.N.⁽²⁾

(1) Transcript, Vol. 160 p. 23770

(2) Same, Vol. 165, p. 24364-5

POLYMERISATION AND COPOLYMERISATION PRODUCTS
(FOR EXAMPLE, POLYETHYLENE, POLYTETRAHALO-
ETHYLENE, POLYISOBUTYLENE, POLYSTYRENE, POLY-
VINYL CHLORIDE, POLYVINYL ACETATE, POLYVINYL
CHLOROACETATE AND OTHER POLYVINYL DERIVATIVES,
POLYACRYLIC AND POLYMETHACRYLIC DERIVATIVES,
COUMARONE-INDENE RESINS) - B.T.N. 39.02

INTRODUCTION

The products of this heading are produced by polymerization or co-polymerization, without the prior synthesis of macro-molecules by condensation, polycondensation or polyaddition (heading 39.01). Polymerization is a process in which identical, simple, unsaturated molecules unite by the opening of multiple carbon-to-carbon bonds in their molecular structure. Co-polymerization is a similar process involving the union of chemically different, simple, unsaturated molecules.

The principal products are given as examples in the wording of the heading, with the exception of such newer forms as polypropylene. They are discussed in the Explanatory notes under the following sub-headings; examples of products are noted under the sub-headings.

- (1) Polymerization products of ethylene or its substitution derivatives, particularly the halogen derivatives; principal products, polyethylene and polypropylene;
- (2) Polyisobutylene;
- (3) Polystyrene, its co-polymers and terpolymers, including the acrylonitrile-butadiene-styrene resins;
- (4) Polyvinyl derivatives (principally polyvinyl chloride) and polyvinylidene derivatives;
- (5) Polyacrylic and polymethacrylic derivatives (principally emulsions and polymethyl methacrylate sheets);
- (6) Coumarone-indene resins.

The presentation of product information in the following pages is generally in the order of the above broad groupings. Certain resins of smaller commercial importance are dealt with as "other products" in this part of the report. These include petroleum resins and the polytetrahaloethylenes of group (1) above.

All the materials of 39.02 are thermoplastic resins, but not all thermoplastics come under heading 39.02. Some of considerable commercial importance, such as some forms of nylon, processed by polycondensation or polyaddition, are classified in the B.T.N. under heading 39.01. Another important group of thermoplastics are the cellulose of B.T.N. heading 39.03.

The following table gives some general orders of magnitude; the data exclude production for captive use.

1964				
	<u>Commercial Production</u>	<u>Imports</u> thousand pounds ^(a)	<u>Exports</u>	<u>Consumption</u>
All resins	506,300	137,905	108,550	535,655
All thermoplastics	398,450	95,135	104,950	388,635
Thermoplastics of 39.02	348,000	85,550	100,100	333,450

(a) Net resin dry basis, except for surface coatings

Source: Canadian Plastics, February, 1965

At a very approximate average price of 20 cents per pound, the value of thermoplastics of heading 39.02 consumed in 1964 would be of the order of \$65 million. Consumption of these products, in the aggregate, is increasing very rapidly. Polyethylene, polyvinyl chloride and copolymers, and polystyrene and copolymers, together with ABS terpolymers and latices of polystyrene-butadiene, account for very large proportions of these totals and, as noted in subsequent pages, for the rapid advances.

The principal basic resins of heading 39.02 were the subject of proposals for widely varying rates of duty. The producers of basic resins, for the most part, favoured a rate of 25 p.c., with a minimum, specific duty of four or five cents a pound, for the principal resins that are made in Canada. Lower rates were often proposed for the resins that are not made in Canada. The reasons for the proposed increases in rates of duty on the made-in-Canada resins have been stated in the general introductory section to this Chapter. They are concerned chiefly with the outstanding rate of expansion in world capacity and the decline in prices, together with "incremental pricing" which was said to make resins available for export to Canada at a price that just covered direct costs and possibly made some contribution to overhead costs.

Specific rate minima were proposed by some companies as a means of meeting competition from "seconds", "off-grade", "scrap" and "end-of-run" material.

Many producers of film and other processed forms requested rates commensurate with those on resins. This proposal resulted in requests, particularly for film, for an ad valorem rate of 30 p.c., and on some for a specific minimum of eight cents a pound.

One or two producing companies, however, took the view that there should be as few exceptions as possible, either for higher or lower rates, to the general level of rates of duty proposed by the industry for chemicals, namely 15 p.c., B.P., 20 p.c., M.F.N.

For some of the principal resins, most particularly polyethylene and polyvinyl chloride, the issue was raised of competition between the primary producers who are also compounders, processors, converters and fabricators, and their customers who only undertake the

later stages of production and who felt that increased rates on resins would enable the integrated producers to control the cost of the basic resins to the point of forcing unintegrated producers out of business. The unintegrated processors, therefore, frequently urged duty-free entry, or the existing, comparatively low rates of duty on the basic resins, and tended to emphasize the importance of this request more than the proposed rates of duty on the products of their manufacture.

Other submissions, usually by consumers, importers, or companies abroad exporting to Canada, asked for free entry for products not made in Canada and also for some which are made.

POLYETHYLENE

The Product

The term polyethylene embraces a large and growing family of thermoplastics which are strong, tough, light in weight, odourless and tasteless. They are excellent electrical insulators, highly resistant to chemicals and they provide an excellent moisture barrier. The material has a distinctive wax-like appearance and varies from thin, colourless and transparent film to white and translucent sheets. Depending on density, it varies also from extreme flexibility to substantial rigidity.

Polyethylene is produced by the polymerization of highly purified ethylene gas in the presence of a suitable catalyst. The resins may be manufactured in a range of densities which are classified as low, medium (or intermediate) and high. Density is the principal factor which determines the physical characteristics of the different resins and it reflects the nature of the chain of ethylene molecules of which the polymer exists. If the chain is essentially linear, the resin is of the high density type; if it is branched, the resin is of low density. The production of low density polyethylene, the conventional form of the plastic which originated in Great Britain prior to World War II, involves the use of extremely high pressures and temperatures to polymerize the ethylene. A new process, requiring only normal range temperatures and pressures together with special, highly active catalysts, was developed in the early 1950's to produce high density resin. This high density, or linear, polyethylene is less flexible than the conventional material but exhibits greater heat resistance, tensile strength, hardness, abrasion resistance and impermeability to liquids and gases. Generally speaking, it has tended to complement rather than compete with the older product.

Polyethylene resin emerges from the reaction process as a viscous, watery-white liquid and is cooled, extruded through orifices and, after solidifying, cut into pellets for shipping. During the process, conditions of the reaction may be varied so as to tailor the product to suit particular applications. Subsequent to the reaction, small percentages of anti-oxidants, pigments, or other materials may be mixed with the primary resin to form compounds designed for special end-uses.

Polyethylene resins, whether pure, pigmented or otherwise compounded, are readily manipulated by normal processing procedures such as extruding, moulding and calendering. Their major use is in the manufacture of film, sheet, and lay-flat tubing for packaging, construction and industrial applications. Other important uses are in the injection moulding of housewares, toys and other articles; in the extrusion of pipe; in the coating of telephone and power wire and cable; in paper coating and in bottle blowing. Special low molecular weight polyethylene resins are employed as additives in waxes and printing inks.

The Industry

The primary sector of the polyethylene industry in Canada comprises the firms that manufacture the basic resins and compounds. There are four resin producers: Canadian Industries Ltd. (C.I.L.); Dow Chemical of Canada Ltd.; Du Pont Co. of Canada Ltd. and Union Carbide Canada Ltd. C.I.L., the initial Canadian producer, began operations at Edmonton, Alberta in 1953 with a designed capacity of 25 million pounds of polyethylene per year; this has been increased to approximately 45 million pounds.⁽¹⁾ The company obtains its supplies of ethylene by cracking ethane extracted from the natural gas available in the area. Polymerization is accomplished by the high pressure process and the polyethylene produced is of the "conventional" type with a density range of low to medium.

Union Carbide, the largest Canadian producer, started to manufacture polyethylene resin at Montreal East in 1957. The capacity of the Montreal plant, initially some 34 million pounds of resin annually, is reported to have been expanded to over 100 million pounds.⁽²⁾ The bulk of the company's ethylene requirements is met by captive production from local refinery feed stocks. Initially Union Carbide, like C.I.L., produced only resins of low and medium densities, but recent additions to the plant are reported to be designed to manufacture some 25 million pounds per year of high density resin.⁽³⁾

Dow Chemical and Du Pont commenced the production of polyethylene during 1959 in the Sarnia area where ethylene is available from local petroleum refineries. During the initial phase of development, Dow's capacity is reported to have increased from six million pounds a year to an estimated 14 million in 1964, and Du Pont's to have expanded during the same period from 30 to 50 million pounds.⁽⁴⁾ Both plants employ the catalytic low pressure method to produce the "linear" type, high density resins. Du Pont, however, has developed a distinctive process which, while it yields essentially linear molecular chains, permits controlled introduction of side chains and branches.⁽⁵⁾ As a result, the company can produce a variety of polyethylene resins which includes all except those in the very low density ranges.

(1) Transcript, Vol. 136, p. 20377

(2) Canadian Plastics, February 1965

(3) Canadian Chemical Processing, May 1963, p. 5

(4) Canadian Plastics, February 1963 and 1964

(5) Transcript, Vol. 140, p. 20875

In total, the productive capacity for polyethylene resins of all densities by the four manufacturers in Canada appears to be close to 225 million pounds per year. Actual production is estimated to have been about 200 million pounds in 1964. A substantial part of this production, perhaps as much as 25 per cent, is captive for use by these companies in further processing operations.

The four resin manufacturers all produce polyethylene compounds by the addition of small amounts of other materials to the basic resin. It was reported at the public hearing that well over half of all polyethylene resin sold contains additives in some measure.⁽¹⁾ There are also a few firms in Canada, such as Kayson Plastics and Chemicals Ltd. of Preston, Ontario, which do not manufacture the basic resin but blend and market polyethylene compounds from domestic or imported resin.

In addition to the primary sector comprising the resin and compound producers, there is the secondary sector of the industry made up of the numerous plants which process the basic material into finished products. Customarily these plants engage in several operations - extruding, moulding, fabricating, etc. - and work with other plastics, such as polyvinyl chloride, polyvinylidene chloride and polypropylene, as well as polyethylene. A significant proportion of this secondary stage of production, particularly in the film and packaging field, is owned and operated by the resin producers on an integrated basis. Most of the unintegrated companies in the field, which number in the hundreds, are relatively small-scale operations.

The location of polyethylene resin plants is very largely determined by proximity to plentiful supplies of the basic raw material. Since ethylene is a gas not readily transported, the primary industry is tied geographically, as well as economically, to petroleum refineries or to supplies of natural gas. The three Canadian producers who obtain their supplies from the large eastern refinery feed stocks are located in the major market area for polyethylene in Ontario and Quebec. C.I.L., on the other hand, has its resin plant linked to Alberta's abundant supplies of natural gas and is not situated so conveniently as the others to the principal domestic markets. Plants engaged in processing and fabricating operations are less dependent on proximity to the petroleum industry and most of these are near their principal markets in the large cities.

The Market

Resins

The growth in the market for polyethylene in recent years has been spectacular; polyethylene has become the most popular of the many plastics materials available. Canadian commercial consumption of the resin in 1964 was estimated at 160 million pounds, about 30 per cent of the total for all plastics.⁽²⁾ The average annual increase in

(1) Transcript, Vol. 138, p. 20630, 20646

(2) Canadian Plastics, February 1965

domestic demand for polyethylene resin in recent years has been of the order of 25 per cent and a similar rate has prevailed in the United States of America. The following estimates of consumption in Canada indicate the very sharp rise over the five years from 1959 to 1964.

Commercial Consumption of Polyethylene Resin in Canada, 1959-64
million pounds

1959	60
1960	73
1961	87
1962	113
1963	137
1964	160

Source: Canadian Plastics

During the same period, production has grown even more rapidly than consumption, from an estimated 59 million pounds in 1959 to about 196 million in 1964.(1)

External trade in resins constitutes an important aspect of the Canadian industry. Imports, particularly in the early years, played a key role in the development of the polyethylene market and since domestic production began on a large scale in the late 1950's, exports have also become important. Unfortunately, data concerning imports and exports are very limited and the trade estimates submitted at the public hearings were scanty and sometimes conflicting. Such information as is available indicates that, as a percentage of domestic commercial consumption, resin imports have declined considerable in recent years - from over one third in 1960 to approximately 15 per cent in 1964. Virtually all of the imports are from the United States of America and, according to statements made before the Board, a substantial portion of them may not be competitive with domestic production, being specialty grades or material imported by the Canadian resin manufacturers themselves to round out their product lines.(2) In contrast to imports, exports of resin and compounds have maintained steady increases in recent years, reaching 55 million pounds in 1964, thus making Canada a net exporter on a substantial scale. Canada's exports go to many countries; Hong Kong, the United Kingdom and Europe are usually the principal markets. Fairly complete trade data are available only for the years 1962, 1963 and 1964.

(1) Canadian Plastics, Feb. 1962, 1963, 1964, 1965

(2) Transcript, Vols. 137, 139, 146, p. 20404, 20686, 21821 respectively

Canada's Trade in Polyethylene Resins, 1962-64

	<u>Imports</u>		<u>Exports</u>	
	'000 lb.	\$'000	'000 lb.	\$'000
1962	27,146	7,604	35,534	6,701
1963	22,437	5,332	38,964	6,327
1964	26,669	6,248	54,857	9,109

Source: D.B.S., Trade of Canada

Although, in value terms, Canada's external trade in polyethylene resins was fairly evenly balanced, at the time of the hearing in 1963, numerous expressions of concern were made to the Board with respect to the future. Attention was drawn to the apparent world over-capacity; the following data were submitted to illustrate the situation as it appeared in 1961.

International Comparisons of Polyethylene, 1961

	<u>Capacity</u>	<u>Production</u>	<u>Consumption</u>	<u>Imports</u>	<u>Exports</u>
		million pounds per year			
World	3,700	..	2,700	-	-
U.S.	2,200	1,500	1,225	0	360
U.K.	390	290	175	10	130
Common					
Market	650	490	405	150	-
Japan	250	130	230	90	1
Canada	140	100	90	20	30

Source: Transcript, Vol. 140, p. 20881

Estimates based on announced building intentions indicated that world capacity was expected to reach almost 5 billion pounds a year by the end of 1963 whereas projected demand was only 3.3 billion. The inference was drawn that the estimated surplus of 1.7 billion pounds would result in increasingly intensive international competition and the threat of rising imports and declining exports for Canada. So far, however, this result has not occurred and it is probable that world demand has been growing faster than was anticipated. The market situation in Canada throughout 1964 gave no indication of a trend towards rising imports and declining exports but rather the reverse, and domestic production has continued to show a remarkable rate of growth, apparently straining existing capacity. Undoubtedly the most salient feature of the polyethylene industry in Canada has been the way in which Canadian resin production has expanded in response to rising demand and, in the process, assumed an increasingly dominant position in the domestic market. This expansion is illustrated in the following data on shipments of polyethylene resin. These shipment figures do include most of the captive use by the four producers, amounting, in 1964, to possibly one-quarter of the total.

The following table is illustrative only.

Available Supply and Disappearance of Polyethylene Resin, 1962-64

	<u>Factory Shipments</u>	<u>Imports</u> - thousand pounds -	<u>Exports</u>	<u>Apparent Domestic Disappearance</u>
1962	137,526	27,146	35,534	129,138
1963	163,027	22,437	38,964	146,500
1964	200,036	26,669	54,857	171,848

Source: D.B.S., Catalogue No. 46-002 (monthly) and Trade of Canada

The polyethylene resin market, of course, reflects the demand for the products for which it can be used. Most current applications of polyethylene have been developed to replace the more conventional materials, metal, glass, paper and wood, and have stemmed from the product's many functional properties which continue to be improved. Estimates of most of the different uses of the resins and recent trends in the use pattern are given in the following table relating to the Canadian market from 1961 to 1963:

Estimated Polyethylene Resin Commercial Consumption, 1962-64

	<u>Million lb.</u>			<u>Per Cent</u>		
	1962	1963	1964	1962	1963	1964
Film	43.0	55.0	62.3	38.1	40.1	38.9
Injection, blow moulding and extrusion	33.0	43.0	53.5	29.2	31.4	33.4
Wire and cable coating	16.5	18.6	18.6	14.6	13.5	11.6
Pipe	14.0	13.0	17.0	12.4	9.5	10.6
Paper coating and Other	6.5	7.5	8.7	5.7	5.5	5.5
Total Accounted For	113.0	137.1	160.1	100.0	100.0	100.0

Source: Canadian Plastics

Film

Polyethylene can be made into a tough, transparent film which remains flexible over a wide temperature range. While the specific characteristics of the material may vary depending on the resin used and the techniques employed in manufacture, it may be described in general terms as odourless, tasteless, non-toxic, readily

heat sealable, moisture resistant and possessing a high oxygen permeability. The film is produced mainly by extrusion, either by casting or, more usually, by the blown tube (Visking) method. Its versatile characteristics and low prices have combined to make polyethylene the most popular product in the plastics film field. In addition to its wide use in the packaging of consumer goods such as foods, textiles, hardware, laundry and dry cleaning, the film is being increasingly employed in the manufacture of industrial shipping bags and bag liners to contain fertilizers, asbestos, dry chemicals and similar products. Other expanding industrial applications are in agriculture, building construction, road laying and, in the form of tape, as insulation in electrical wiring. In total, film accounts for about 40 per cent of the polyethylene resin used in Canada.

Estimates presented to the Board with respect to the uses of film in the domestic market indicate that general packaging represents about half; construction 15 per cent; overwraps, particularly bread, 12 per cent; laundry and dry cleaning bags and wraps about 8 per cent; industrial bags about 8 per cent, and industrial glazings some 7 per cent.(1)

The manufacture and use of polyethylene film embraces three categories of producers, the resin manufacturers, the film extruders and the film converters. Film grade resins are produced by three companies in Canada, Union Carbide, C.I.L. and Du Pont, and these same firms, together with Dow Chemical, are also film extruders. The spokesman for Dow Chemical noted that company's interest in film in the following way:

"We make a very small amount of film. We have just started into the business. We do buy some film and convert it...I guess it is a fair amount."(2)

Statements made to the Board indicate that the resin producers, through their integrated operations, now supply some 80 per cent of the market for film. Estimates of the number of unintegrated film producers that divide the remainder of the market varied from under ten to as many as twenty.

The data available concerning the Canadian polyethylene film market show a steady growth. Shipments were 24 million pounds in 1960, 32 million in 1961, 35 million in 1962, 42 million in 1963 and 46 million in 1964. Corresponding values at the plant for those years were about \$12 million, \$14 million, \$16 million, \$19 million and \$21 million. Total production, including captive, was 44 million pounds in 1962, 53 million in 1963 and 63 million in 1964. Available data show imports of 3.1 million pounds in 1962, valued at \$2.3 million, 3.8 million pounds in 1963, valued at \$2.2 million and 4.6 million pounds in 1964, valued at \$2.3 million. The average value of the imports was about 57 cents a pound in 1963 and 49 cents a pound in 1964 compared with a stated price range for plain film of from 40 to 60 cents per pound; it was noted by the C.I.L. spokesman that most of the imports at the time of the hearing were of types not made in Canada.

(1) Transcript, Vol. 138, p. 20542

(2) Same, Vol. 140, p. 20835

Export data on polyethylene film are not available; there appeared to be general agreement at the hearings that exports were relatively insignificant.⁽¹⁾

The resin producers, in addition to extruding the film, are engaged in converting it, principally into bags of various types. Many other firms are also converters of film and their number, though considerable, is subject to frequent change since the operation can be started with relatively small investment in equipment. Evidence given at the hearings suggests that, as the process of integration has expended from resin to film to bags, the number of unintegrated firms producing film and bags has declined, and the degree of market control by the resin producers has increased.

Generally speaking, such a trend would not be unexpected, given the larger financial resources of the resin manufacturers and their greater capacity to undertake research and sales expenditures to broaden their market influence. There were, however, opinions voiced by the unintegrated film converters appearing before the Board that the development of market domination by integrated producers has been speeded up in Canada because of a special licensing arrangement, controlled by Union Carbide and affecting the production of film by the popular blown tube method. Under the terms of this arrangement, Union Carbide's Visking process can be used by others on a royalty-free basis, but the producers are bound to pay to the owners of the patent 6¢ per pound on any polyethylene film and tubing produced from imported resin. They also agree not to import film which can be obtained in Canada at comparable prices. The situation was described by one producer in the following words:

"The greatest problem facing Canadian film producers is the fact that there is no free play of competition in the market for primary film grade resins. By reason of the royalty arrangement referred to above and the existing duty, the Canadian companies are denied effective access to foreign sources of supply. The result has been that whereas there has been a general downward trend in primary polyethylene prices in world markets at large and notably the United States, there has been an upward trend in Canada... Because they are denied access to alternative foreign sources of supplies and because of the maintained high prices of Canadian resins, Canadian independent film extruders and converters are unable to expand their operations into foreign markets and are confined to the Canadian Market."⁽²⁾

Other Uses

The characteristics of polyethylene, such as flexibility, "non-breakability", ease of processing and colouring, etc., have lent themselves to a rapid expansion of the product in a wide variety of forms in addition to film. Moulding and other general extrusion processes now account for over 30 per cent of the resin consumed. From housewares such as waste-baskets, garbage pails and squeeze bottles,

(1) This view is also expressed by Canadian Plastics, June 1963, p. 57
 (2) Transcript, Vol. 147, p. 21954

to toys, to artificial flowers, to industrial uses such as carrying cases, housings, and appliance parts, the application of this material to modern living conditions continues to grow in bewildering array. The technique of blow moulding, particularly since the introduction of high density resin with its increased strength and low permeability, has opened up a wide area to new polyethylene applications in such forms as baby bottles, liquid detergent and bleach containers. Large shipping receptacles and carboys of polyethylene, both injected and blow moulded, are becoming an important factor in the industrial container market.

Polyethylene pipe has proved itself suitable for all cold water services and, although encountering increasing competition from other plastics, has an established market for farm, mine and home use which accounts for some ten per cent of resin consumption. As a coating, polyethylene has proved invaluable in the electrical field where it is employed as an outer jacket on power cables, telephone lines, etc., providing both insulation and a protective barrier against moisture, weathering and abrasion. The employment of coatings of polyethylene for paper, aluminum foil and polyester film has added valuable characteristics to the finished products. Minor uses for polyethylene are many and varied and new applications of the material are continually making their appearance in the market.

There are a large number of firms in Canada producing these processed and fabricated forms of polyethylene, and most of them are relatively small in size. Integrated operations in this field by the large-scale resin producers have not become as significant an element in the market as in the case of film, although they appear to be on the increase; Union Carbide, for example, has become very active in the manufacture of polyethylene pipe, toys, housewares and similar products.

Prices and Pricing Policies

Technological developments combined with the rapid growth in markets and in world manufacturing capacity have effected a dramatic decline in the price of polyethylene in recent years. The average selling price of these resins in Canada for all applications has fallen from some 65¢ per pound in 1949 to less than 25¢ per pound in 1963. The following data showing price trends over the five years prior to 1963 were supplied to the Board.(1)

Average Selling Price of Polyethylene Resins, 1958-63

	<u>All applications</u>	<u>Film Grade</u>
	- cents per lb. -	
1958	31.35	36.0
1959	32.15	36.0
1960	31.26	33.5
1961	25.92	28.5
1962	26.02	30.5
1963 (Jan.)	24.72	28.5

(1) Transcript, Vol. 138, p. 20662

Prices in Canada are quoted on a delivered basis and the range for polyethylene resins varies depending on end use. Typical low and medium density resin prices per pound were reported in March, 1963 to the Board as being 28½¢ for the film grade; 17¢ to 26¢, depending on grade, for injection moulding and 26¢ for blow moulding; resins for pipes and extruded shapes were under 20¢ per pound for utility grades, 22½¢ per pound for low density and 31¢ for intermediate, while wire and cable applications ranged from 36½¢ to 38½¢.⁽¹⁾ High density resin prices were stated to be 31¢ to 34¢ per pound. Comparative Canadian-U.S. prices for high density resins were submitted during the public hearings.

Prices of High Density Polyethylene Resin, 1958-63

	<u>Canada</u> cents per lb.	<u>U.S.A.</u> U.S. cents per lb.
1958	-	43
1959	38	38
1960	32-38	32-38
1961	31-34	32-35
1962	31-34	32-35
1963	31-34	29½-31½

Source: Transcript, Vol. 140, p. 20815

Considerable discussion took place with respect to the price of resin for film, the largest use. As mentioned previously, the unintegrated producers of film expressed the view that the Visking patent arrangement greatly increased the degree of control over the film resin market in Canada exercised by the integrated resin producers and made it less competitive than that for other resins. It was their contention that, while Canadian resin producers have had to lower the prices of moulding, and other type polyethylene resins in response to declines in the U.S.A. and elsewhere, they have been able, since the licensing arrangement went into effect on January 1, 1962, to more or less insulate the domestic film resin price from outside influence. In support of this view, the Board was informed that, whereas the U.S. price for first-grade film resin declined from 27½ cents per pound in 1961, to 24½ cents in March 1962 and 20 cents in January 1963, the price of Canadian film-grade resin on the same dates was 28½ cents, 30½ cents and 28½ cents per pound. Later the same year the price was reported to have declined to 18¢ per pound in the U.S.A. while it remained at 28½¢ in Canada. These comparative price movements were explained by one of the unintegrated film producers in the following words:

"within two months of the signing of the royalty agreement referred to above the basic price of film grade resin in Canada was increased from 28½¢ per pound to 30½¢ per pound. At approximately the same time the price of some film grade resins in the United States was reduced by 2-3 cents per pound. The immense price differential between the cost of

(1) Transcript, Vol. 137, p. 20445

foreign primary resin and Canadian resin is indicated by the fact that the approximate U.S. selling price is at present in the low 20 cent per pound range whereas the Canadian selling price is 30½ cents per pound."(1)

Tariff Considerations

Polyethylene in its primary forms is entered chiefly under the following tariff items:

<u>Item</u>	<u>B.P.</u>	<u>M.F.N.</u>
901 (a) Synthetic resins without admixture, including scrap or waste: 8. Polyethylene type	7½ p.c.	7½ p.c.
901 (b) Synthetic resins in the form of aqueous emulsions, aqueous dispersions or aqueous solutions, without admixture: 8. Other type	Free	Free
902 Synthetic resins, compounded with other materials, in any form, including scrap or waste, for moulding, casting, extruding, calendering, pressing, (moulding compositions or materials for processing into moulding compositions); synthetic resins compounded with other materials in the form of not fully cured preforms or not fully cured blanks for compression mouldings: (e) Polyethylene type	10 p.c.	10 p.c.
904 Synthetic resin compositions, n.o.p.	15 p.c.	15 p.c.
905 Synthetic resin plates, sheets, film, sheeting or strips, not less than 6 inches in width, n.o.p.; synthetic resin lay-flat tubing, not less than 6 inches in circumference, n.o.p.:— (c) Polyethylene type: 1. Plain, uncoated, undecorated 2. Other	12½ p.c. 15 p.c.	12½ p.c. 15 p.c.
906 Synthetic resin plates, sheets, film, sheeting or strips, less than 6 inches in width, lay-flat tubing less than 6 inches in circumference, other tubing, blocks, bars, rods, non-textile monofilament; synthetic resin profile shapes produced in uniform cross-section and imported in lengths: not further manufactured than moulded, cast, calendered, extruded or pressed, n.o.p.:— (e) Other type	15 p.c.	15 p.c.

(1) Transcript, Vol. 147, p. 21955

<u>Item</u>	<u>B.P.</u>	<u>M.F.N.</u>
917 Reinforced or supported synthetic resin or cellulose plastics plates, sheets, sheeting, strips, tubing, blocks, bars, rods, in which is incorporated a layer of paper, fibreboard, or textile fabric, or a core of fibres whether matted or otherwise arranged, n.o.p.:- (b) Other	15 p.c.	15 p.c.

Tariff Proposals

In addition to the more general submissions referred to in the introductory note, the following companies submitted proposals relating specifically to polyethylene:

Canadian Industries Ltd., Montreal, Quebec
 Dow Chemical of Canada Ltd., Sarnia, Ontario
 Du Pont of Canada, Ltd., Montreal, Quebec
 Union Carbide Canada Ltd., Montreal, Quebec
 Leco Industries Ltd., Montreal, Quebec
 Richmond Plastics Ltd., Richmond, Quebec
 W.R. Grace and Co. of Canada Ltd., Cryovac Div., Cooksville, Ont.
 W. Ralston and Co. (Canada) Ltd., Montreal, Quebec
 Atlantic Paper Products Ltd., Scarborough, Ontario
 Deerfield Laminations Ltd., Newmarket, Ontario
 Paisley Products of Canada Ltd., Scarborough, Ontario
 Duplate Canada Limited and Plax Canada Limited, Toronto, Ontario
 Rubber Association of Canada, Toronto, Ontario
 Canadian Pulp and Paper Association, Montreal, Quebec
 Canadian Manufacturers of Chemical Specialties Association,
 Montreal, Quebec

Resins and Film

All four producers recommended an increase in the present rates of duty for polyethylene resins. Dow Chemical and Union Carbide proposed that resins and compounds be accorded rates of 15 p.c., B.P. and 20 p.c., M.F.N., with a specific minimum of 5¢ per pound. Du Pont asked that the rates be 25 p.c., both B.P. and M.F.N., with a 5¢ minimum per pound. C.I.L. proposed the same rates as Du Pont under the M.F.N. Tariff but preferred to make no recommendation with respect to the rate under the B.P. Tariff.

Of the three resin producers who also make polyethylene film, Du Pont proposed a B.P. and M.F.N. rate of 25 p.c. with an 8¢ per pound minimum. As with the resin, C.I.L. did not make a recommendation under the B.P. Tariff; for plain film, it made the same proposal as Du Pont under the M.F.N. Tariff but for film other than plain, C.I.L. proposed a rate of 30 p.c., M.F.N. to provide "an adequate differential on decorated film to compensate for high costs of design and decoration in Canada." (1) C.I.L. proposed the 30 p.c., M.F.N. rate also for laminates of all films. Union Carbide recommended

(1) Transcript, Vol. 137, p. 20508

the same ad valorem rate for film as that which it had proposed for resin, i.e. 15 p.c., B.P., 20 p.c., M.F.N., but with a specific minimum of 8¢ per pound. Dow Chemical, which at the time of the hearing, was not producing significant amounts of film, thought the same rates should apply on the film as on the resin.

The resin producers' requests for increased rates were vigorously opposed by the unintegrated film manufacturers. Leco Industries Ltd., manufacturers of film and lay-flat tubing, did not object initially to a rate as high as 10 p.c. for resins as long as the rates on film were not less than 15 p.c. but, after some discussion of the problem before the Board, changed its view in favour of the existing rates.⁽¹⁾ The status quo was also supported by such film producers as W.R. Grace & Co., (Cryovac Division) and Richmond Plastics, Ltd. (The operations of Richmond Plastics Ltd. have since been taken over by Dow Chemical of Canada Ltd.) W. Ralston & Co. (Canada) Ltd. proposed that the tariff on resins be removed and rates on film be set in the neighbourhood of $7\frac{1}{2}$ p.c. to $12\frac{1}{2}$ p.c.⁽²⁾ W. Ralston & Co. (Canada) Ltd. thought that a rate of at least 75 p.c. higher for film than resin was required to protect against imported film competition; if, for example, the rate of duty were 10 p.c. on the resin the rate on film should be no lower than $17\frac{1}{2}$ p.c.⁽³⁾ There were some processors who thought that the present margins of difference of 5 and $7\frac{1}{2}$ percentage points between resins and plain and decorated film, respectively, were appropriate and should be maintained. W.R. Grace & Co., on the other hand, felt that, "Tariffs on plastic film should be no higher than those for the corresponding resins. This would provide adequate protection for efficient Canadian production."⁽⁴⁾

Submissions from film producers also included one from Atlantic Paper Products Ltd., asking for a $22\frac{1}{2}$ p.c. rate on plain film, and another from Deerfield Laminations Ltd., requesting that the rates on polyester film coated with polyethylene be 20 p.c., B.P. and M.F.N. This proposal is noted under linear polyesters of heading 39.01.

Paisley Products of Canada Ltd., a firm specializing in the manufacture of electrical insulating materials, proposed that polyethylene film, sheet, etc. carry a rate of 15 p.c., B.P. and 15 p.c., M.F.N. when decorated or surface worked; otherwise the rate should be the same as that recommended by the company for heading 39.02, 10 p.c. B.P. and 10 p.c., M.F.N., but not less than 2¢ per pound.

Duplate Canada Limited and its associated company, Plax Canada Limited claimed in letters to the Board, that they require certain polyethylene moulding compounds not produced in Canada. They recommended that the 10 p.c. rate under tariff item 902(e) be left unchanged until such time as the compounds they require are made in Canada.⁽⁵⁾

In a general brief opposing any increases in rates of duties on the various resins used by its members, the Rubber Association

(1) Transcript, Vol. 148, p. 21977

(2) Same, Vol. 138, p. 20585, 20603

(3) Same, Vol. 138, p. 20585

(4) Same, Vol. 136, p. 20237

(5) Same, Vol. 159, p. 23703

of Canada included polyethylene resins among those to which its recommendation was applicable.(1)

On behalf of its members, the Canadian Pulp and Paper Association opposed any increases in duties on products used in the industry. Among the materials specifically mentioned were polyethylene resins used in coating compounds, and also artificial waxes of heading 34.04 used in calender stock solutions for sizing. Some of these waxes may be the low molecular weight polyethylene resins mentioned below. In 1958, the industry used more than one million pounds of such waxes.(2)

Special Resins

In addition to the proposals pertaining to resin and film referred to above, there were two submissions to the Board which concerned certain low molecular weight polyethylene resins used in the manufacture of artificial wax for polishing. These special type resins do not ordinarily compete with the higher molecular weight resins used for moulding and film, and they are not at present made in Canada. In the Brussels Nomenclature they probably are classified under heading 34.04 (Artificial waxes) rather than 39.02. However, the Department of National Revenue has ruled that they come under tariff item 901(a)8, as polyethylene resins; they are, therefore, within the scope of the Reference.

At the hearing there was general agreement between the two interested parties, the Canadian Manufacturers of Chemical Specialties Association (C.M.C.S.A.) and C.I.L., that under the Brussels' system this particular form of polyethylene should come under heading 34.04 rather than 39.02.(3)

There was agreement also that, insofar as the resins used specifically for wax polish were concerned, there should be free entry until they are made in Canada. A problem arose, however, as to the wording which would properly identify these wax-type resins and, at the same time, avoid the possibility of free entry for other low molecular weight polyethylene resins which are more widely used. C.I.L. objected to the wording proposed by C.M.C.S.A. on the grounds that it was broad enough to permit the free entry of resins that could compete with polyethylene made by C.I.L. for certain applications such as coating paper. Since there appears to be a very large potential market for polyethylene-coated paper, particularly in the field of milk cartons, C.I.L. was anxious to ensure that resins used in this application should not obtain free entry. At the same time, the company, as a matter of principle, wished to avoid the introduction of a specific item covering resin used for wax polishes and so proposed a wording that, while not referring to end use, is designed to allow free entry for the non-competitive wax-type resins of interest to C.M.C.S.A. and exclude all others. The recommended wording is:

"The following until ruled made in Canada: Emulsifiable grade polyethylene having an acid number of not less than

(1) Transcript, Vol. 123, p. 18405

(2) Same, Vol. 129, p. 19359; Vol. 130, p. 19386

(3) Same, Vol. 148, p. 22076, 22098

10 and a weight average molecular weight not exceeding 5000, without admixture, in lumps, powders, granules or flakes."(1)

The C.M.C.S.A. stated with reference to C.I.L.'s wording that "we have no objection to the proposed weight average molecular weight definition."(2)

However, it would appear that the wax polish industry uses both oxidized type resin, which is emulsifiable, and non-oxidized resin, which is not; the C.I.L. wording, limited to "emulsifiable grade polyethylene", would not include the non-oxidized type. This presumably is why the C.M.C.S.A. representative went on to say, "We would be happy to have the polyethylene waxes of the non-oxidized type placed under an end-use item for use in polishing compounds only." C.I.L. indicated in response that, if the Board thought it necessary to provide free entry for these nonemulsifiable types, an end-use item would be preferable to a general one.

Finally, on the matter of the relation of this item to the present Reference, the C.I.L. representative made the following statement:

"We do know that the materials for which duty-free entry has been requested, both of the emulsifiable and non-emulsifiable grade, will not fall under the Brussels 39.02 section. It would therefore presumably not fall in group 12 which has been proposed, I believe, by the Industry Committee for chemicals and allied products in the new tariff, and would then require, as will many other products which have been heard previously in this hearing, reference made outside the proposed group 12 in the new tariff schedule. This item, if it had the wording which we proposed or if in the Board's judgment, it should have the wording as proposed by the Association, does not necessarily have to refer to the rest of Brussels, which presumably will not be part of the tariff schedule."(3)

Summary of Arguments Relating to Tariff Proposals

The polyethylene resin producers took the position that adequate protection for the industry, in the face of world surpluses and the relatively high cost of Canadian production, required substantially increased rates of duty on their product. They contended that a serious degree of overcapacity, particularly in the U.S.A., was in the process of development and it would greatly intensify international competition, depress world prices even further, and adversely affect Canadian export sales. Even more important, in their view, was the fact that the Canadian market, with relatively low tariff protection, was extremely vulnerable to import competition. Although, as yet,

(1) Transcript, Vol. 148, p. 22097

(2) Same, Vol. 148, p. 22110

(3) Same, Vol. 148, p. 22098

this vulnerability had not been reflected in large scale imports, it had resulted in a persistent downward pressure on prices and profit margins. In this connection, C.I.L. cited the company's large investment in the production of polyethylene resin and noted that this had not been a very rewarding one. The manufacture of polyethylene, it was said, is a risky business that requires a very large capital investment in relation to sales and "Such risks can only be justified... if Canadian manufacturers are assured of substantially all of the home market." (1) The domestic manufacturers, as a group, maintained that most other polyethylene producing countries had a tariff structure better adapted to deal with domestic market problems arising from excess world supplies than had Canada.

The threat to the Canadian industry posed by a situation of world overcapacity in polyethylene resin production was said to be augmented by the higher costs of manufacture that prevailed in Canada compared to other major producers. The Board was told that many foreign competitors, including those in the U.S.A., were able to obtain cheaper raw materials and maintain larger scale operations than were Canadian producers. Resultant cost advantages were said to amount in some instances, to more than five cents a pound. This cost differential was presented, in the comparison with the U.S. producers, to consist of approximately three cents for ethylene, one cent for processing, and one cent for other factors such as sales, administrative and research costs. With reference to plant capacities and the scale of production, it was stated that, on the basis of U.S. experience, a minimum market of over 50 million pounds was necessary for economical operation of a resin plant and the suggestion was made that "if Canadian producers can obtain the entire share of the domestic market, the growth in demand will, within a few years, provide sufficient volume to enable the companies manufacturing polyethylene to operate as economically as at least one half of the plants now in operation in the United States." (2) This position would seem to presuppose that no other producers entered the market. A number had come into production in past years when average output, to serve the domestic market, was certain to be less.

Another problem which attracted concern on the part of the resin manufacturers was import competition in the form of sales of off-grade and scrap resin. It was competition of this kind, sometimes referred to by the producers as "disguised dumping" which prompted their request for specific duty protection in addition to an ad valorem rate.

According to the resin producers, approval of the rates proposed would ensure the domestic manufacturer of the Canadian market and thereby would upgrade the value of a Canadian resource, provide an increased demand for skilled employment, and, in the case of C.I.L.'s Edmonton operation, help to further diversify the prairie economy. C.I.L. was also convinced that competition from other domestic polyethylene producers and from other competitive products would "discourage any undue rise in price". (3)

(1) Transcript, Vol. 136, p. 20388

(2) Same, Vol. 140, p. 20884

(3) Same, Vol. 136, p. 20390

Turning to their recommendations for tariff increases on film, C.I.L., Du Pont and Union Carbide again emphasized the threat of world overcapacity, their relative cost disadvantage vis-a-vis foreign competition and the vulnerability of Canada's "low tariff" market. According to C.I.L., the rates proposed for film bear:

"an appropriate relation to the rates requested by the company for resin, and provide an adequate differential on decorated film to compensate for high costs of design and decoration in Canada. The minimum specific rate of eight cents per pound on plain film is needed to prevent importation of film made in the United States under distress conditions and imported at prices which bear no relation to the normal cost of film manufacture."(1)

Such a minimum would "only affect plain film having a market price below 32 cents per pound" (in 1961 the average price for plain film shipments in Canada was reported to be 41 cents per pound), and it would, therefore not interfere with "normal legitimate trade in polyethylene film."(2)

Opposition to proposals for increased rates on resins was contained in such general submissions as those from the Rubber Association, dealt with in the introduction to this chapter and those of the Society of the Plastics Industry, discussed under heading 39.07. Other opposition to the proposals for increased rates on polyethylene resin came mainly from the unintegrated film extruders. These companies, generally speaking, felt that the producers were in no great need of tariff protection and, in the interests of keeping resin prices as low as possible, they recommended that duties on polyethylene resin be removed entirely, or at least remain at their present levels. Many of the extruders, as indicated previously, were concerned with the growing power of the integrated producers over the domestic film market, and they emphasized the even greater influence the latter could secure if duties on resin were increased. Leco Industries Ltd., for example, stated that:

"Under existing patent licensing and tariff arrangements, the company is dependent upon its Canadian competitors for its supplies and cannot turn to imports as alternative sources of supply. The proposals for tariff revision made by the chemical industry would make it the company even more dependent upon its suppliers who are also its competitors."(3)

And, further:

"Our concern is that this present 6 cents per pound royalty will become a built-in long term protection, so that something which we may regard as temporary over three or four years, should the Board accede to this request, could well be built into a permanent protection."(4)

(1) Transcript, Vol. 137, p. 20508

(2) Same, Vol. 137, p. 20513

(3) Same, Vol. 147, p. 21951

(4) Same, Vol. 147, p. 21968

According to Richmond Plastics:

"We pay a normal retail price of .28 $\frac{1}{2}$ for resin...whereas their film divisions /the integrated producers/ can use their own company produced resin, at doubtless a cost advantage.

"A good film resin could be bought by us in the U.S. for 20 cents but a recently imposed royalty of 6 cents a pound on imported resins, plus exchange and surcharges prevents us from trying out new U.S. resin qualities."(1)

The spokesman for W.R. Grace analyzed the situation in the following words:

"The serious concern of the independent film manufacturer and converter is that all of the Canadian manufacturers of resin are, or are about to be engaged in the manufacture of film and/or in the printing and converting of film materials. It is quite easy to see that with outside sources of resins and films cut off by high protective tariffs of 25 per cent, the resin producer can raise the price of resin to the height of the effective tariff wall, gain all his profit margin then from the sale of the resin and operate his film manufacturing and converting plants at the very slimmest of margins--thus forcing his independent competitors out of business."(2)

Similar views were expressed by W. Ralston & Co., another film producer.(3)

In response to these assertions, Union Carbide, the owners of the Visking process, stated that the company's licensing agreements with the non-resin producers were intended simply to preserve the resin market as much as possible for Canadian resin producers, and assist in the preservation of the film market for Canadian extruders.(4) To achieve the former objective, the agreements required that the licensed firm not import polyethylene resin to make film and tubing in Canada if the variety required can be obtained from Canadian producers on reasonable notice and at competitive prices. The penalty for doing so was a levy of 6 cents per pound of imported resin. The second objective was sought by means of policing imports of film, an obligation undertaken by Union Carbide under the agreements, to ensure that none was entered of the type produced by the patented Visking process. Both these objectives, according to the company, have been pursued with some considerable success; licensed extruders have not been using imported resin and any reported imports of Visking type film have been quickly followed up and dampened down by the company.

(1) Transcript, Vol. 148, p. 22051-2

(2) Same, Vol. 136, p. 20241

(3) Same, Vol. 138, p. 20582

(4) Same, Vol. 139, p. 20780

In making its statement of these objectives, Union Carbide did not deal directly with the allegations made by the unintegrated producers that the agreements had had the effect of strengthening the position of the integrated producers vis-a-vis their competitors or that increased tariffs would further strengthen this position. Du Pont, however, did comment to the effect that, while there might well be a trend towards integrated production, it was certainly not feasible to argue that the resin producers, if given increased protection, could manipulate prices so as to enlarge their share of the film market. Such a course was impractical on both commercial and legal grounds since polyethylene resin is sold on a highly competitive basis and "To do otherwise would be to contravene the Combines Investigation Act".⁽¹⁾ In essence, the reply of the integrated producers to the fears expressed by the unintegrated was that it would not be in their interests as manufacturers of the basic product to seek prices that would in any way retard the growth in demand for polyethylene resins and films or encourage the use of other resins and films in place of polyethylene, though it was not clear how these objectives would necessarily assist the unintegrated film producers to retain a share of the market.

Analysis of Tariff Proposals

The present situation of the polyethylene industry in Canada is characterized by an impressive rate of expansion in both demand and supply. The dramatic growth in consumption of resin, at rates averaging about 25 per cent a year, shows no signs of slackening off in the near future. At the same time the current rate of domestic production, together with announced plans for substantial increases in present levels of output, indicate that the industry has, and will continue to have, the necessary capacity to serve the greater part of the domestic market. The issue, then, would seem to be whether this situation, which appears so satisfactory on the surface, is one that nevertheless warrants significant alteration in the level of tariff protection which the industry has been afforded over the past twelve or more years.

The proposals made to the Board with respect to the appropriate level of tariff protection on polyethylene reflected a sharp difference of view between those who produce the primary resins and those who buy them. Whereas all the resin manufacturers requested a substantial increase in the present duties, the users in general asked that the status quo be preserved. The arguments made by the resin producers in support of their proposals centred around such problems as world overcapacity, relative cost disadvantage of domestic producers, and the vulnerability of the Canadian market to imports. These, of course, are matters also raised by the manufacturers of many other chemical products in connection with their requests for changes in the rates of duty. As general problems common to the industry as a whole, they have been discussed elsewhere in this report. In the following paragraphs they will be considered only within the particular context of the polyethylene sector of the industry.

(1) Transcript, Vol. 140, p. 20900

At the hearings in March 1963, the fears and portents voiced by the producers concerning large-scale surplus production of polyethylene were based on estimates and projections of the world supply-demand position, and these data suggested that an overcapacity situation, which had existed for some time, was becoming more serious. U.S. capacity, in particular, was viewed with alarm and the Board was told that "the United States has been building polyethylene capacity at a rate that cannot be absorbed for some years by its own market."⁽¹⁾

Developments in the polyethylene industry since early 1963, however, have not to date, borne out these forecasts. A U.S. trade publication reported, late in 1964, that U.S. polyethylene capacity is not building up fast enough to keep pace with demand and added that, "If present polyethylene production rates don't falter during the few remaining months, '64 output could reach 2.7 billion lbs. and would seriously press PE capacity."⁽²⁾ A further account noted that the use of polyethylene is being pushed to new records and "producers in the United States say their plants are operating at full capacity and that they are currently dipping into stocks to fill shipments."⁽³⁾ In short, the estimates made before the Board in early 1963 have, to date, been invalidated by the spectacular growth in world consumption of this versatile plastic, and it would appear that Canadian manufacturers, like those in the U.S.A. and elsewhere, are at present more preoccupied with the problem of expanding capacity to meet ever increasing demand than with fending off a flood of imports generated by "world over-capacity." This situation could, of course, change in the future.

The Canadian resin producers were generally of the view that their costs of production were significantly higher than their competitors abroad and this was reflected in the particular claim by C.I.L. that its raw material, ethylene, which constitutes about 50 per cent of resin costs, was some three cents per pound more expensive to obtain than was that in the U.S.A. The available evidence suggests that, while there are certainly some differences in the cost of ethylene as between selected producers in the two countries, a margin of as much as three cents would not seem to be usual, though it could reflect the situation for captive use in some plants in the U.S.A., considerable distance from the Canadian market. As far as commercial supplies are concerned, ethylene is available both in the U.S.A. and Canada, at fairly comparable prices of about five or six cents a pound.⁽⁴⁾ It should be noted, also, that Dow Chemical has stated that production of ethylene in Canada is not a high cost industry, and indicated that the gas could be made just as cheaply in Sarnia as in the competitive areas of the northern U.S.A.⁽⁵⁾

Further cost disadvantages were said to arise because of the smaller size of plants in Canada relative to those in the U.S.A. At the same time, however, it was admitted that the major economies of

(1) Transcript, Vol. 140, p. 20882

(2) Chemical Week, Nov. 21, 1964, p. 8

(3) Montreal Gazette, Jan. 5, 1965

(4) At the hearing on ethylene it was said that the price was of the order of 5,6, or 7 cents a pound (Vol. 40, p. 5990); the published U.S. price at the close of 1964 was $4\frac{3}{4}$ to 5 cents per pound

(5) Transcript, Vol 40, p. 6005

scale were obtainable in a plant of about 50 million pounds a year, a capacity which all but one of the companies in Canada had achieved, and it was expected to reach that level early in 1965.⁽¹⁾ Of interest, also, is the fact that six of the approximately twenty-five polyethylene plants operating in the U.S.A. in 1964 were of 50 million pounds capacity or less and only four were of sufficient size to avail themselves of whatever additional cost advantages accrue to very large plants, of over 150 million pounds capacity. These four, moreover, were all located in the Gulf Coast area and would have to offset substantial transportation disadvantages in competing in the major Canadian market area.

It was also argued by the producers that because Canada's tariff rates on polyethylene resin were lower than those in most other countries, the Canadian market was particularly vulnerable to import competition. There is, however, no present indication that such vulnerability has resulted in massive imports of resin or film. Imports have averaged about 25 million pounds in recent years and they represent a steadily declining share of domestic consumption. Canadian production, meanwhile, has continued to grow and, besides serving to an ever greater degree the requirements of the domestic market, has continued to demonstrate, by way of expanding exports, a capacity to compete successfully in the markets of the world.

Finally, a word on the rather complex issue, involving the Visking licensing arrangements on polyethylene film, which was raised by the unintegrated film manufacturers. The latter, as indicated previously, expressed more concern about these agreements and the possibility of an increase in the duty on their basic raw material, the resin, than they did about possible changes in rates of duty on the film they produce. Any increase in the duty on the resin would, in their view, give their competitors, the integrated film and resin producers, an even greater advantage in supplying film because of the license agreements.

The evidence submitted to the Board does suggest that the Visking licensing agreements have been used to provide some additional protection to the domestic producers of resin for film. This added protection, however, will disappear when the patent licences run out in 1966 unless, of course, present tariffs are raised substantially as recommended by the producers, or new patent and licensing conditions arise.

Whether these licensing agreements have been a significant element in increasing the share of the film market being supplied by the resin producers is difficult to judge since there are a number of other factors that could contribute to this trend. What it has done, undoubtedly, is to increase the cost of importing film resin by six cents a pound and thus to make the unintegrated producers dependent for their raw material supplies upon their competitors in the film market, apparently at prices somewhat higher than they might have been able to obtain them if purchasing abroad, free of the licensing arrangements. As has been noted above, the unintegrated producers seemed to be principally concerned that the proposed rates of duty on the basic resin would perpetuate this situation.

(1) Canadian Chemical Processing, Jan., 1965, p. 59

POLYPROPYLENE

The Product

Polypropylene is a thermoplastic material which combines toughness and rigidity with the lightest weight of any of the plastics now in commercial use. It has high heat tolerance, good mechanical and electrical characteristics and unusual chemical resistance even at elevated temperatures. In the form of film, polypropylene combines clarity and strength with excellent moisture and vapour barrier properties.

Polypropylene resin is made by the polymerization of high-purity propylene gas in the presence of a catalyst at relatively low pressures and temperatures. The material is composed of large, chain-like molecules arranged in unusually regular order (isotactic) a formulation made possible by the use of special catalysts (stereospecific) developed in Italy in the 1950's. The facilities required to polymerize polypropylene are very similar to those used to produce high density polyethylene and some of the newer plants in the United States are designed to switch production from one product to the other in response to market demands.⁽¹⁾

The plastic in its basic form is a white, fine-grained powder which can be processed by moulding or extrusion with the use of conventional thermoplastic equipment. Major uses are in film for packaging and in the manufacture of such products as luggage, housewares, toys, containers, sports and safety goods, appliance housings, auto and machine parts, electrical appliances and textile and other fibres. The fact that polypropylene, unlike many plastics, can be subjected to boiling water without adverse effects has made it particularly useful in such applications as hospital and laboratory ware and in washers, driers and dishwashers. The material also has a uniquely high flex life which has been adapted to many uses where integral hinges are appropriate. In the form of monofilament, and multifilament fibres, the strength, durability and extreme lightness of polypropylene has made it increasingly popular for the manufacture of ropes, twines, ships' hawsers and similar products, and for knitted apparel, hosiery, carpets and upholstered fabric. However, in spite of the wide range of valuable properties demonstrated by this comparatively new plastic it has proven to have certain drawbacks relating to its performance at low temperatures, its rate of oxidation and this difficulty of dyeing polypropylene as a filament have not been entirely overcome and have limited, to some extent, the scope of its application.

The Market

Polypropylene resin has not been produced in Canada in commercial quantities. Estimates of imports for the plastics industry indicate an impressive rate of growth in demand for the product.

(1) Chemical and Engineering News, May 13, 1963, p. 102

Consumption of Polypropylene by the Plastic
Industry in Canada, 1961-64

	<u>Moulding</u>	<u>Extruded</u> '000 lb.	<u>Total</u>
1961	..	..	450
1962	750	750	1,500
1963	1,500	1,700	3,200
1964	3,000	2,250	5,250

Source: Canadian Plastics, Feb. 1963, 1964 and 1965

Canadian Plastics also estimated that in the years 1963 and 1964 there were an additional 2,300,000 pounds and 3,000,000 pounds, respectively, imported for use by the textile industry, a total estimated consumption of 5,500,000 pounds in 1963 and 8,250,000 pounds in 1964 which can be accounted for in those years. D.B.S. data on imports of polypropylene resins are available only since 1963; they show somewhat higher totals than the Canadian Plastics estimates; 6,363,000 pounds valued at \$1,878,000 in 1963 and 9,274,700 pounds with a value of \$2,285,920 in 1964.

Although these estimates of Canadian consumption suggest that the use of polypropylene resin is growing rapidly and is divided fairly equally among the moulders, the film extruders and the textile manufacturers, there is no information immediately available to the Board to indicate more precisely the present end-use pattern or the probable rate of future growth. However, U.S. experience with this new plastic may help to give some impression of the uses and the rate of growth which might be expected for polypropylene in Canada over the next few years.

Polypropylene: End-use Pattern, U.S.A.

	<u>Consumption</u> million pounds	
<u>Outlet</u>	<u>1963</u>	<u>1968 (Forecast)</u>
Injection Moulding	115	390
Film - Cast	25	30
- Oriented	5	90
Fibres - Monofilament	25	30
- Multifilament	10	100
Misc.	10	50
Total	190	690

Source: Chemical and Engineering News, May 13, 1964, p. 101

This table suggests that, while injection moulding and film uses may continue to consume about three quarters of the total

production in the U.S.A., the most dynamic area of growth will be in multifilament yarn for the textile industry. Such a development would be in the direction of the pattern of use already established in Canada, as indicated by the estimates previously quoted.

The same U.S. source had this comment to make concerning the future of polypropylene: "The road to the market place will be a bumpy one for polypropylene, but despite all its frustrations, the resin seems assured of a 30 per cent per year growth rate over the next five years."⁽¹⁾

Canada's imports of polypropylene resin in 1963 and 1964 came entirely from the U.S.A. The producers in that country, in 1963, are listed in the following table, together with estimated plant capacities.

U.S. Polypropylene Producers, 1963

<u>Firm</u>	<u>Estimated Capacity</u> million pounds
Alamo Polymer, Texas	25
Avisun Corp., Delaware	120
Dow Chemical, California	20
Firestone, Texas	10
Hercules, Louisiana	90
Humble Oil, Texas	80
Monsanto Chemical, Texas	50
Novamont, W. Virginia	30
Rexall Chemical, Texas	30
Shell Chemical, New Jersey	80
Texas Eastman, Texas	<u>30</u>
Total	565

Source: Chemical and Engineering News, May 13, 1963, p. 101

In contrast to these capacity figures, polypropylene production in the U.S.A. during 1963 was reported to be only about 197 million pounds, or some 35 per cent of available capacity.⁽²⁾ In this connection, it is worth drawing attention to the statement made before the Board that, on the basis of U.S. experience, the smallest economic polypropylene plant would be of the order of 45 million pounds a year,⁽³⁾ a level of production which contrasts markedly with present Canadian consumption of just over 9 million pounds. However, it might also be noted that more than half of the companies listed in the table above have a capacity of less than 45 million pounds and that all the plants apparently were operating in 1963 at an average rate of about 18 million pounds per year. Given also the rate of growth in Canadian

⁽¹⁾ Chemical and Engineering News, May 13, 1963, p. 103

⁽²⁾ Modern Plastics, October 1964, p. 161

⁽³⁾ Transcript, Vol. 149, p. 22146

consumption, it is not inconceivable that production could be undertaken in Canada in the near future. Indeed, Dow Chemical of Canada Ltd. indicated at the public hearing an intention to produce polypropylene.(1)

The competitive relationship of polypropylene to other resins already established in the market is an important factor to be taken into account in assessing future demand for the product. At the public hearing there was a great deal of emphasis placed by some parties on the unique features of polypropylene which set it apart from other plastics. Others, however, stated that it was almost identical in its qualities with certain other polymers, particularly high density polyethylene, and that such differences as existed were in degree rather than kind. It was contended, for example, that polypropylene more closely resembled high density polyethylene than the latter resembled low density polyethylene. On balance, it would appear that while polypropylene certainly does have some distinctive characteristics it is, in most of its applications, essentially similar to and directly competitive with other plastics, for example, polyvinylidene chloride, polyethylene and cellophane with respect to film, and polystyrene and polyethylene in other extrusion and moulding applications. In the textile field it competes with nylon, the acrylics and the linear polyesters as well as with the traditional natural fibres.

The relatively high price of polypropylene was represented as the principal factor limiting the growth in demand for this versatile product. However, it was also stated that the price had been dropping consistently and had reached a level, early in 1963, of 32¢ per pound in the U.S.A. for general purpose, injection moulding type. The price in Canada for the comparable product was reported to be 34½¢ and, as was pointed out by the producer of a competitive resin, this price, coupled with the fact that the material was about 5 per cent lighter in weight, made it competitive with high density polyethylene priced at 31¢ to 34¢ per pound.(2) Other types of polypropylene resins, including those used by the textile industry, were said to range in price as high as 46¢ a pound. More recent information indicates published prices in the U.S.A. of 25¢ a pound for the general purpose resin to over 30¢ a pound for specialty formulations. The average value of imports during 1963 was 29½¢ per pound, but in 1964 it had declined to about 24½¢ per pound, a price which would certainly not be so high as to limit the growth of polypropylene in competition with high density polyethylene and other comparable synthetic resins.

Tariff Considerations

Polypropylene in its primary forms may be imported into Canada under the following tariff items:

(1) Transcript, Vol. 136, p. 20338

(2) Same, Vol. 149, p. 22154

<u>Item</u>	<u>B.P.</u>	<u>M.F.N.</u>
901 (a) Synthetic resins without admixture, including scrap or waste:		
9. Other type	Free	Free
902 Synthetic resins, compounded with other materials, in any form, including scrap or waste, for moulding, casting, extruding, calendering, pressing, (moulding compositions or materials for processing into moulding compositions); synthetic resins compounded with other materials in the form of not fully cured preforms or not fully cured blanks for compression mouldings:		
(f) Other type	Free	Free
905 Synthetic resin plates, sheets, film, sheeting or strips, not less than 6 inches in width, n.o.p.; synthetic resin lay-flat tubing, not less than 6 inches in circumference, n.o.p.:-		
(f) Other type:		
1. Plain, uncoated, undecorated	Free	Free
2. Other	10 p.c.	10 p.c.
906 Synthetic resin plates, sheets, film, sheeting or strips, less than 6 inches in width, lay-flat tubing less than 6 inches in circumference, other tubing, blocks, bars, rods, non-textile mono-filament; synthetic resin profile shapes produced in uniform cross-section and imported in lengths: not further manufactured than moulded, cast, calendered, extruded or pressed, n.o.p.:-		
(e) Other type	15 p.c.	15 p.c.

A number of specific recommendations were made for polypropylene, in addition to the various general proposals for heading 39.02 which have been noted in the introductory section.

Du Pont of Canada Ltd. recommended, on the grounds that the two products were closely competitive, that polypropylene resin should bear the same 25 p.c. rate, with a 5¢ per pound minimum, ⁽¹⁾ as was proposed for polyethylene. Dow Chemical of Canada Ltd., maintained its general position that, because of the competitive relationship between all plastics, there should be no exceptions to its proposed

(1) Transcript, Vol. 149, p. 22156

heading rates of 15 p.c., B.P. and 20 p.c., M.F.N. The spokesman for Dow Chemical stated that:

"we intend to be producing polypropylene in Canada before the results of Reference 120 can result in tariff changes. As a result, any exception rates qualified by a not made in Canada provision are not likely to be applicable in practice."⁽¹⁾

Canadian Industries Limited proposed a rate of 25 p.c., M.F.N. with an 8¢ per pound minimum for both polyethylene and polypropylene plain film and sheet as an exception from the company's general heading rate of 25 p.c. with a 5¢ per pound minimum.⁽²⁾ In the view of this company, "Film and sheet made from polypropylene are produced by methods similar to those used for polyethylene and compete in the same applications."⁽³⁾ C.I.L. also recommended that polypropylene and polyethylene film, other than plain, be dutiable at 30 p.c., M.F.N. Effective January 6, 1966, polypropylene film and sheeting were ruled to be of a class or kind made in Canada for Customs purposes.

Among the importers, Argo Plastics and Chemicals Ltd. and Caledonia Chemicals Ltd. proposed that the present duty-free provision for polypropylene resins be retained so as not to "impede the building up of a market in anticipation of Canadian production."⁽⁴⁾ Leco Industries Limited took the same position.⁽⁵⁾ Avisun Corporation requested duty-free entry for both the resin and film, until made in Canada "in significant quantities by more than one producer."⁽⁶⁾ W.R. Grace and Co., which produces polypropylene film, showed the same preference for the status quo with respect to polypropylene as it did for polyethylene.⁽⁷⁾ None of these companies made proposals to the Board for rates to be applied to polypropylene resin, if produced in Canada.

Canadian Celanese Limited, which was concerned with the textile applications of polypropylene, requested a specific end-use item that would allow the resin "without admixture other than stabilizing compounds, for use in the manufacture of man-made fibres" to be entered duty-free "when of a kind not made in Canada." According to this company, polypropylene resins for manufacture of man-made fibres "have characteristics which are unique to this material, and which are distinct from polyethylene."⁽⁸⁾ The company indicated that it would not oppose a 20 p.c., M.F.N. rate on these resins if made in Canada.

(1) Transcript, Vol. 149, p. 22200

(2) Same, Vol. 149, p. 22220

(3) Same, Vol. 137, p. 20515

(4) Same, Vol. 149, p. 22126

(5) Same, Vol. 148, p. 21978

(6) Same, Vol. 149, p. 22161

(7) Same, Vol. 136, p. 20243

(8) Same, Vol. 149, p. 22163

POLYISOBUTYLENE

At the time of the public hearing, polyisobutylene was not produced in Canada. Canadian Petrofina Limited subsequently announced its intention to build a plant at Pointe-aux-Trembles, Quebec, to produce polyisobutylene; this plant is now in operation.

Minnesota Mining and Manufacturing Company of Canada Limited made the only proposal on this product and asked for Free entry for liquid polyisobutylene until it is ruled made in Canada, at which time the company proposed the heading rates of 15 p.c., B.P. and 20 p.c., M.F.N.⁽¹⁾ No particulars were furnished concerning the use of the product in Canada, or its commercial significance.

Polyisobutylene is classified by the B.T.N. as a synthetic resin of heading 39.02, but in the administration of the existing Canadian Customs Tariff, it is considered to be "synthetic rubber" and classified under tariff items 616 and 618. As such, it is not within the terms of Reference 120.

In a letter to the Board, commenting on another product now considered to be synthetic rubber for Canadian Customs purposes, Polymer Corporation Limited, Sarnia, Ontario, indicated that it is opposed to any tariff changes which would result in materials, currently considered to be synthetic rubber, being made dutiable or being classified as synthetic resins.⁽²⁾

The Industry Committee, as part of its proposal for the adoption of the classification of Chapter 39, proposed that there be a qualification to the effect that "This Chapter does not cover: synthetic rubbers as defined by regulations prescribed by the Minister, or articles thereof."⁽³⁾ In view of the current administration of the Canadian Tariff as it relates to polyisobutylene, this would require the deletion of polyisobutylene as an example listed in the wording of heading 39.02.

POLYSTYRENE, COPOLYMERS AND TERPOLYMERS

Polystyrene is a thermoplastic resin produced by the polymerization of styrene, a monomer derived from ethylbenzene. In its unmodified form, it is a hard, rigid, relatively brittle material with good resistance to chemicals and heat and with excellent dielectric properties. The material is manufactured in a wide variety of resins and compounds obtained by the addition of colouring matter, stabilizers, plasticizers or fillers, and adapted to a multitude of different uses,

(1) Transcript, Vol. 162, p. 24087

(2) Same, Vol. 136, p. 20373, 20374

(3) Same, Vol. 121, p. 18071

Polystyrene resin may also be modified in the process of manufacture by the incorporation of an expanding agent to make expandable polystyrene beads for use in the production of polystyrene foam; other specific purpose polymers involve the use of rubber, glass fibre, alpha methyl styrene, or other special additives. An increasing number of resins with unique qualities are being produced by the co-polymerization of styrene with other monomers. There are also polystyrene emulsions produced by the polymerization of styrene monomer in an aqueous medium. All Canadian requirements of the monomer are normally met from domestic sources.

The sections immediately below deal only with more common commercial forms of polystyrene resins and moulding compounds; the expandable polystyrene beads, as a special compound, and foamed polystyrene produced from the beads are dealt with separately. They are followed by consideration of polystyrene film and sheet, polystyrene emulsions and the principal styrene copolymers.

The Product

Unmodified or general purpose polystyrene is produced by the polymerization of styrene monomer in the presence of catalysts. In its natural form, the resin is clear and colourless, enabling production in a wide range of colours. It can be moulded or extruded in the pure or compounded state using conventional thermoplastic equipment. For many applications, in particular when greater elongation or impact strength is required, the resin is modified by the incorporation of rubber to produce medium and high impact grades of polystyrene. These principal polystyrene resins, the general purpose type and the impact types, are similar in chemical properties, although the latter cannot be produced in transparent colours and certain other qualities, such as tensile and flex strength and stain resistance, are somewhat impaired.

The Industry

There are three producers of polystyrene resins in Canada: Dow Chemical of Canada Limited, Sarnia, Ont.; Monsanto Canada Limited, Montreal, Que. and Kayson Plastics & Chemicals Ltd., Preston, Ont. This domestic polystyrene industry had its beginnings in 1946 when Dow and Monsanto were encouraged by the ready availability of styrene from Polymer Corporation, Limited, to build resin plants. Later, in 1953, Dow Chemical broadened its production base by building its own monomer plant at Sarnia. The third resin producer, Kayson, entered the field in 1956 with a plant at Preston, Ont. Recent information is that the company has been purchased by Polymer Corporation. Except for expandable polystyrene beads, which are produced only by Dow Chemical under license from the German firm of Badische Anilin and Soda Fabrik, the three producers make all the common commercial grades of resin. At the time of the public hearing, it was estimated that total Canadian capacity for polystyrene resin was about 80 million pounds annually. Allowing for captive requirements in the production, for example, of polystyrene foam, sheet and fabricated products, as well as for the commercial domestic and export market of the order of 60 million pounds annually, in 1963, it would appear that the Canadian industry is operating fairly close to capacity.

The Market

While Canadian production of polystyrene in 1964 appears to have been approximately equal to that of polyvinyl chloride and to have exceeded that of any other plastic except polyethylene, domestic consumption of polystyrene was much below that of polyvinyl chloride; much more polystyrene is exported than imported, whereas for polyvinyl chloride the reverse is true. The three producers sold some 60 million pounds of polystyrene resins and compounds, valued at approximately \$10 million; export sales accounted for nearly half of the commercial production, while imports were equivalent to only about 17 per cent of the estimated commercial production.

The principal methods used in processing polystyrene are injection moulding and sheet extrusion followed by moulding. The resulting products are used in many fields, such as packaging, parts for refrigerators and other appliances, toys and novelties, wall tiles, lighting fixtures, housewares and electronic and other industrial applications. Over 90 per cent of the domestic consumption of polystyrene resins was said to be in Ontario and Quebec.(1)

While various statistics have been published for polystyrene resins, it is difficult to obtain complete data. The quantities in the following table give an indication of market trends over the last six years

Polystyrene and Impact Copolymers, 1959-64

<u>Year</u>	<u>Commercial Production</u>	<u>Imports</u>	<u>Exports</u>	<u>Apparent Domestic Commercial Disappearance</u>
		- thousand pounds -		
1959	39,000	9,500	33,900	14,600
1960	44,000	12,000	35,500	20,500
1961	43,500	11,500	27,600	27,400
1962	41,000	9,800	21,700	29,100
1963	59,600	9,500	30,400	38,700
1964	61,400	10,400	27,400	44,400

Source: Canadian Plastics, various issues; D.B.S., Trade of Canada

Canadian Plastics also provides an estimated breakdown by methods of processing for the polystyrene resins sold in Canada, as follows:

(1) Transcript, Vol. 134, p. 20041

	<u>Moulding</u>	<u>Extrusion</u>	<u>Foam & Other</u>	<u>Total</u>
	- thousand pounds -			
1959	11.5	4.5	1.0	17.0
1960	13.5	4.5	2.0	20.0
1961	15.0	5.0	2.0	22.0
1962	18.2	6.0	3.1	27.3
1963	21.8	6.7	6.5	35.0
1964	24.5	7.2	7.0	38.7

D.B.S. total shipments data show quantities, in recent years, approximately double the domestic use shown above. These data include shipments for export; they also include some double-counting as materials move from one stage of processing to another. However, the data, taken together with those on imports and exports, do suggest that Canadian producers supplied more than 80 per cent of total domestic requirements, while at the same time exporting a substantial part of their output of polystyrene.

Shipments of Polystyrene, 1960-64
- thousand pounds -

<u>Year</u>	<u>'000 lb.</u>	<u>\$'000</u>	<u>\$/lb.</u>
1960	55,839	10,261	.18
1961	59,696	10,658	.18
1962	60,747	11,574	.19
1963	79,295	14,628	.18
1964 (estim.)	82,000	15,000	.18

Source: 1961-1963: D.B.S., Production of Specified Chemicals, Cat. No. 46-211

It may be noted that, both in quantity and value terms, shipments increased by nearly 50 per cent in the four years, 1960-1964, an average rate of increase of about 12 per cent a year. The average value of shipments remained very stable, although available information indicates that prices of particular grades of resins declined substantially through these years.

As with other major resins, such as polyethylene and polyvinyl chloride, the price of polystyrene fell sharply in recent years. General-purpose, clear material in truckload or carload quantities, was quoted, on a delivered basis, at 29.5 cents per pound in 1955, at 19.25 cents early in 1963 and 17 cents per pound in 1964 and 1965.(1) The U.S. published price, which had been steady at least from October 1961, dropped from 18 cents per pound in January 1963, to 14.5 cents per pound in February 1964. In both countries prices for small quantities and special grades are much higher.

(1) Canadian Chemical Processing; Transcript, Vol. 134, p. 19995

Selected Canadian Prices of Polystyrene Resins, 1959-65

<u>Year</u>	<u>Hi-impact, natural, T/L, frt. prepaid</u>	<u>Hi-impact, colors, T/L, frt. prepaid</u>	<u>General purpose crystal, C/L, frt. prepaid</u>	<u>General purpose colors, C/L, frt. prepaid</u>
	- cents per pound -			
1959	29.0	34.5	25.0	29.25
1960	29.0	31.5	22.25	27.0
1961	29.0	31.5	19.25	24.0
1962	29.0	31.5	19.25	24.0
1963	26.5	30.0	18.0	22.0
1964	25.0	28.5	17.0	21.0
1965	23.5	27.0	17.0	21.0

Source: Canadian Chemical Processing

Imports and Exports

The Dominion Bureau of Statistics has published import statistics for polystyrene only since January 1, 1962. These figures include imports of polystyrene emulsions (latices) and of expandable resin.

Imports of Polystyrene, 1962-64

	<u>All Countries</u>			<u>From U.S.A.</u>		
	<u>'000 lb.</u>	<u>\$'000</u>	<u>\$/lb.</u>	<u>'000 lb.</u>	<u>\$'000</u>	<u>\$/lb.</u>
1962	9,792	2,682	.27	9,568	2,623	.27
1963	9,543	2,497	.26	8,996	2,334	.26
1964	10,407	2,732	.26	9,172	2,362	.26

Source: D.B.S., Trade of Canada, Imports

The average value of imports suggests that most of the imports are of high impact material or of other compounds. Imports from countries other than the U.S.A. have been principally from West Germany, with small amounts from Britain, France and the Netherlands.

U.S. export statistics give a longer time series, but include a greater quantity and variety of resins. U.S. export statistics relate to "styrene polymer (polystyrene) and copolymer resins containing 60 per cent or more styrene, in all unfinished and semi-finished forms (except laminated and except film and sheeting and rubber compounding agents) (dry weight)." For example, they include copolymers such as some of those combining styrene with acrylonitrile or butadiene; some of the copolymers are the subject of separate presentations below. The higher average values suggest that the additional quantities consist largely of compounds, copolymers or other forms beyond the basic resin.

U.S. Exports to Canada of Styrene
Polymer and Copolymer Resins, 1958-64

	<u>'000 lb.</u>	<u>\$'000</u>	<u>\$/lb.</u>
1958	10,900	3,320	.31
1959	13,468	3,711	.28
1960	15,229	4,167	.27
1961	15,168	4,037	.27
1962	14,968	4,337	.29
1963	16,755	5,150	.31
1964	16,760	5,015	.30

Source: United States Department of Commerce, Bureau of the Census, F.T. 410, United States Exports of Domestic and Foreign Merchandise, s.c. 82520

Canada was one of the first producers of polystyrene and large quantities have traditionally been exported. Since 1950, the first year for which records are available, it has been exported, from time to time, to 64 different countries; in 1964, it was exported to 23 countries. Through the years, major customers have included France, Hong Kong, West Germany, India, Japan, the Netherlands and the United Kingdom. As countries developed their own production facilities, they ceased to provide important markets for Canadian polystyrene. In recent years, Hong Kong and the Netherlands have been the principal markets. The steady decline in the world price of polystyrene, which was emphasized by the producers at the public hearings, is reflected in the following data relating to Canadian resin exports.

Exports of Polystyrene Resins,
Selected Years 1950-64

	<u>'000 lb.</u>	<u>\$'000</u>	<u>\$/lb.</u>
1950	8,650	2,129	.25
1953	25,425	7,379	.29
1956	21,104	6,174	.29
1959	33,903	8,382	.25
1960	35,456	7,583	.21
1961	27,628	5,236	.19
1962	21,715	3,571	.16
1963	30,394	4,269	.14
1964	27,385	3,781	.14

Source: D.B.S., Trade of Canada, Exports

In summary, the available data suggest that the domestic market for polystyrene resins tripled in the five years, 1959-1964, that rising Canadian production is supplying an increasing, and imports a decreasing, proportion of this market and that Canadian exports, while fairly steady in volume terms, have been considerably lower in value in recent years than in some of the earlier years.

Tariff Considerations

Polystyrene resins are imported mainly under the following tariff items:

	<u>British Prefer- ential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>	<u>General Tariff</u>
901 (a) Synthetic resins without admixture, including scrap or waste: 5. Polystyrene type	7½ p.c.	7½ p.c.	17½ p.c.
902 Synthetic resins, compounded with other materials, in any form, including scrap or waste, for moulding, casting, extruding, calendering, pressing, (moulding compositions or materials for processing into moulding compositions); synthetic resins compounded with other materials in the form of not fully cured preforms or not fully cured blanks for compression mouldings: (c) Polystyrene type	10 p.c.	10 p.c.	20 p.c.

Representations relating to polystyrene resins and moulding compounds were received from two of the producers, Dow Chemical of Canada Limited and Monsanto Canada Limited. Both companies recommended rates of 15 p.c., B.P. and 20 p.c., M.F.N., with a specific minimum rate of 5¢ per pound under both Tariffs; they recommended that the products be classified under an item based on B.T.N. heading 39.02.

Except in the case of expandable beads, no other formal submissions relating specifically to polystyrene resins and moulding compounds were received by the Board. However, letters from Smith & Stone Ltd., and Plax Canada Limited, both of Toronto, Ontario,⁽¹⁾ and a later letter from Duplate of Canada Limited, Toronto, Ontario,⁽²⁾ written with reference to the earlier letters from its associated companies, Smith & Stone Ltd. and Plax Canada Limited, were made part of the subject of the public hearing. In the letters written in 1960, the two companies indicated an interest in certain moulding powders which were not made in Canada or not made in the required quality. They requested no change in the current tariff items applicable to these powders until such time as the required products are made in Canada. Smith & Stone specifically listed item 902(c), which applies to polystyrene moulding compounds. The Duplate letter of March 1963,

(1) Transcript, Vol. 159, p. 23701-04; letters dated Dec. 14, 1960

(2) Same, Vol. 159, p. 23700-1; letter dated March 20, 1963

indicated that there had been some improvement in the situation regarding the availability of the required moulding powders in Canada, but stated that the company would prefer that there be no increase in the rates of duty applicable to the specific moulding powders mentioned in the earlier letters as "This would undoubtedly lead to higher raw material costs which the moulders of the finished products fear that they would be asked to absorb."⁽¹⁾ Alternatively, the company suggested that if the Board should recommend increased protection on some or all of the items, there should be corresponding increases in the protection afforded to the finished products.

Polystyrene resins and moulding compounds were also covered by the general proposals referred to in the introductory section of this heading. Some of these also requested that no change be made in the existing items or rates for resins and plastics. Some of the general proposals requested rates of duty of 15 p.c., B.P., 20 p.c., M.F.N., for all products of heading 39.02, or at least for those made in Canada. Others suggested rates of 25 p.c. ad valorem with a minimum of 5 cents per pound for products of this heading.

In justification of their rate proposals, both Dow Chemical and Monsanto claimed that the Canadian producers require the entire Canadian market to enable them to produce at maximum volume, thus reducing costs and helping them maintain their position in the export market. Based on the 1962 figures, the latest then available, Canadian exports were said to be declining in volume and value, owing to increasing world capacity. As noted above, exports increased in volume in 1963, though unit values suggest that the net realization per pound has continued to decline.

The companies also pointed to the need to supply the same diversity of grades and colours (some 10,000 different shades) in the Canadian market as in the U.S.A., although the latter market was said to be 25 times as large. Dow Chemical noted that:

"Although our costs for comparable runs would come very close to those of U.S. manufacturers, the limitations on run lengths imposed by our market are beyond our control, which adds costs difficult to overcome."⁽²⁾

No indication was given of the cost disadvantage which accrued to the Canadian producer from short runs. Dow Chemical suggested that smaller runs are discouraged in the U.S.A. by higher prices, but said that this is not possible in Canada. Monsanto noted the problem of short runs by indicating that 20 per cent of its total production required 70 per cent of its total individual production runs. Comparative prices were submitted to illustrate the way in which U.S. producers, by higher prices, were better able to control lengths of run:

⁽¹⁾ Transcript, Vol. 159, p. 23701

⁽²⁾ Same, Vol. 134, p. 19993

Prices of Polystyrene Resins, Special Colours, 1955 and 1962

	<u>General Purpose</u>		<u>High Impact</u>	
	<u>Canada</u>	<u>U.S.A.</u>	<u>Canada</u>	<u>U.S.A.</u>
	4,000 lb. lots - cents per pound			
1955	38.5	41.0	41.0	43.5
1962	28.0	40.0	35.5	47.0

Source: Transcript, Vol. 134, p. 19995

Presumably, it is the higher U.S. tariff protection on these resins (2.8 cents per pound plus 18 p.c. ad valorem based on the American selling price) that enables producers in that country to maintain a higher price structure on these short runs than is possible for Canadian producers. On the other hand, it is not clear why Canadian producers keep prices relatively low for short runs if these constitute only some 20 per cent of the output and take up 70 per cent of the production runs.

The proposed specific minimum rates of 5¢ per pound were said to be required to overcome problems created by actual or potential imports of materials described as scrap or off-grade. A spokesman for Dow Chemical said:

"The properties or specifications of polystyrene...range all the way from the highest quality required for the most exacting end use to a very loose specification for non-critical applications. The point is that material which is off-grade for a critical application is in fact prime first grade material for a less critical application. Such material is customarily sold as first quality for the appropriate end use but if a desire exists to circumvent customs duties by establishing a low fair market value, it is quite legitimate to sell the lower quality material as off-grade or sub-standard in spite of the fact that it is identical in all respects to material being sold as first grade. This situation...is common throughout the plastics industry...off-grade plastics commonly sell for $\frac{1}{4}$ to $\frac{1}{2}$ the price of corresponding prime materials...This inability of the plastics industry to precisely define quality, plus extremely low prices for off-grade material, effectively destroys the protection which should be provided by an ad valorem duty."(1)

No information was submitted as to the extent of such importations or illustrative of the actual price differentials. In recent years, imports of polystyrene resins and compounds appear to have been fairly stable and at average values that suggest a large portion of specialty grades or of other higher-priced forms of the product rather than significant amounts of off-grade or distress selling.

It was further pointed out that as polystyrene is thermoplastic, it can be re-heated, formed and cooled several times. Scrap can

(1) Transcript, Vol. 122, p. 18219 -20

be ground and reprocessed into resins that compete with prime quality material in the production of coloured resins or for moulding.

The companies contended that the specific minimum rate would give them some protection against scrap and off-grade materials. It was suggested that protection could not be obtained through the valuation provisions of Section 38 of the Customs Act, particularly because of difficulties of defining and determining grades.

The result of the producers' proposals would be that the specific rate would apply to all shipments from countries entitled to the British Preferential Tariff valued at less than 33-1/3 cents per pound and from M.F.N. countries valued at less than 25 cents per pound. Currently, in the U.S.A., general purpose polystyrene has a published price of 14½ cents per pound and many other grades are listed at prices that would bring the specific minimum rate into application. At the published price of 14½ cents per pound, the ad valorem equivalent of the specific rate would be over 34 p.c.

Notwithstanding the higher rates proposed for imported resins, it was reported in the Monsanto submissions that:

"Because of the ample capacity in Canada, and the competitive activity of the three producers, it is our belief that price increases would not result from the application of the recommended tariff. Nor would Canadian consumers be placed in any disability with respect to supply of the complete range of products required since virtually all types and grades of product would be available from Canadian sources."⁽¹⁾

Expandable Polystyrene Beads

As indicated earlier, these are a form of moulding compound produced by the addition of an expanding agent in the process of producing the resin in the form of pellets or beads. These beads are used in the production of polystyrene foam and foamed board. The sole Canadian producer is Dow Chemical of Canada Limited, which supplies almost the entire Canadian market as well as meeting its own captive requirements. The company stated that it had not developed any substantial export sales.

One other consumer of expandable polystyrene beads, Polychemical Industries Limited, appeared before the Board. The company produces disposable hot drink cups at Edmonton, Alberta, and was, at the time, planning to locate a second plant near Toronto. The company pointed out that it could not use the material produced by Dow Chemical and it was admitted by the latter company that its product could not be used for small mouldings of this type. At the time of the hearing, Polychemical Industries was obtaining its requirements of these beads, said to be 425,000 pounds, valued at \$157,000 annually,⁽²⁾ from Koppers Company Inc., Pittsburg, Pennsylvania, U.S.A., under tariff item 902(c) at a rate of 10 p.c., ad valorem. According to Dow Chemical, this was the only type of bead being imported.

⁽¹⁾ Transcript, Vol. 134, p. 20045

⁽²⁾ Same, Vol. 135, p. 20113

Polychemical Industries requested continuation of the present tariff treatment of the material it must import. The discussion indicated that, in the absence of an end-use criterion, there might be a problem in differentiating for tariff purposes between the material required by Polychemical and that made by Dow Chemical because the imported material could also be used in applications where it would compete with the beads produced by Dow.

A spokesman for Dow Chemical gave the comparable prices at the time of the hearing for expandable polystyrene beads in Canada and the U.S.A. as follows:

	Canada	U.S.A.
	Cdn. ¢/lb., f.o.b. Sarnia	U.S. ¢/lb., freight equalized
Regular beads	41	37
SE beads(a)	49	45

(a) Self-extinguishing, with a chemical incorporated to give flame extinguishing properties to the foam

Source: Transcript, Vol. 135, p. 20095-6

Since the time of the hearing, Dow Chemical has advised the Board it is making arrangements to produce in Canada the size and type of beads required by Polychemical Industries. Dow Chemical has also recently acquired another Canadian company which produces plastic cups, but it is understood that this company at present does not produce cups from expandable polystyrene beads. Dow's general position with respect to resins and plastics was that the rates, without exception, should be 15 p.c., B.P., and 20 p.c., M.F.N., with a minimum of 5 cents per pound under both Tariffs. At the prices of beads given above, the proposed minimum rates would have no effect.

Disregarding freight costs, at the present rate of duty, the duty-paid value of U.S. regular beads would be 3/10 cents per pound below the Canadian price at parity of exchange. At the proposed rate of 20 p.c., M.F.N., the duty-paid price of regular beads would be 3.4 cents higher at par, and about 6.9 cents higher at the average rate of exchange for 1965. The duty-paid price of imported SE beads would in all cases be higher than that of the Canadian product.

Polystyrene Foam

Polystyrene foam is a thermoplastic, unicellular material with properties that make it useful as a thermal insulation and buoyancy medium. It may exist in the form of moulded shapes, sheets, boards, blocks, logs, granules and flakes, or may be made into a wide variety of finished products. Under the B.T.N., it would only be classified by heading 39.02 if it remained in the form of sheets, boards, blocks, logs, granules or flakes, or moulded shapes similar to these, not further processed than cut into rectangles or into lengths not exceeding the maximum cross-sectional dimension. The most important

form of the product sold in Canada which would fall under this heading is that known as bead board, a moulded material in a block about four feet by eight feet which can be sawn like lumber.

Until recently, all polystyrene foam produced in Canada was made from expandable polystyrene beads which are prefoamed and then fused together with the application of heat in an enclosed mould to form a block or shape. The spokesman for Dow Chemical stated that this process is used in Canada by his company and 21 others to produce bead board and other foamed products.⁽¹⁾ Except for Polychemical Industries Ltd., all the firms obtained their supplies of expandable beads from Dow. Not all of them, however, produce bead board in competition with Dow Chemical; some produce other moulded products.

In 1963, Dow Chemical opened a plant in Toronto to produce another type of polystyrene foam made by the extrusion of polystyrene resin with the incorporation of an expanding agent in the process of extrusion. This product is more expensive than the foam made of expandable polystyrene beads although, according to the Dow spokesman at the hearing, most of the uses for which it is sold could be technically satisfied by the latter.⁽²⁾ Prior to the establishment of the new plant Dow had been making "substantial" imports of the new type for sale to Canadian consumers, but expected that these would be replaced by the Toronto-made product. Dow Chemical was also reported, late in 1964, to have purchased Dymor Plastics Limited, Edmonton, Alberta, reported to be the largest producer of polystyrene foam in Western Canada.⁽³⁾

The major use for the product in Canada is in the construction industry as an insulating material; other principal uses are as a cushioning material in packaging and as a thermal insulation. The Dow Chemical submission estimated the total domestic market for polystyrene foam insulation board to be between 35 and 40 million board feet. It was stated that Canadian capacity exceeded the market by about 3 to 1. The D.B.S. has reported that, in 1962, Canadian shipments of polystyrene foam amounted to 3.3 million pounds valued at \$2.5 million and, in 1963, 4.6 million pounds, valued at \$3.5 million, an average value of nearly 76 cents per pound. Exports were said to be negligible.

Prices of both forms of polystyrene foam board were said to be comparable in Canada and the United States. In Canada the product made from expandable beads was said to be selling at prices, varying according to uses and geographical location, ranging from 7 to 10½ cents per board foot delivered; Dow Chemical gave its price as 8 to 8½ cents per board foot, f.o.b. Sarnia. Prior to Canadian manufacture, the second type cost the Canadian consumer about 13½ cents per board foot, based on U.S. price plus duty and freight. It was expected that the price for the Canadian extruded product would be about 11½ cents per board foot in Ontario and Quebec, thus effecting a reduction in price to the Canadian consumer once production is begun in this country. The corresponding price in the U.S.A. was given as 9½ cents per board foot. The new form will still be higher in price than that from expandable beads.

(1) Transcript, Vol. 134, p. 20070

(2) Same, Vol. 134, p. 20083

(3) Financial Post, October 10, 1964

Polystyrene foam in the forms of logs, sheets, blocks or boards, or in flakes, granules or powder, is dutiable under tariff item 907 at rates of 15 p.c., B.P. and 20 p.c., M.F.N. Dow Chemical of Canada Limited recommended that these forms be dutiable at the rates proposed for polystyrene resins under heading 39.02, namely 15 p.c., B.P. and 20 p.c., M.F.N., with a minimum rate of 5 cents per pound under both Tariffs. No other recommendations relating directly to polystyrene foam were received by the Board.

It is apparent that the proposed minimum specific rate would not have much significance in this particular instance since most of the material is sold at prices well above 25 cents per pound. Referring to possible imports of scrap polystyrene foam, the spokesman for Dow indicated that this is not an article of commerce and that he considered that it was unlikely to become one.⁽¹⁾ Such a product, if an article of commerce, could probably be entered duty-free under tariff item 681 as "waste of all kinds, n.o.p." This item is not in Reference 120. Under the B.T.N., the scrap material would be classified by heading 39.02.

There was no discussion of reasons for continuing or discontinuing the differential between the rates now applicable to the major raw material, expandable polystyrene beads, 10 p.c. under item 902(c), and the finished product, polystyrene foam, with an M.F.N. rate of 20 p.c., under item 907. Nor was there evidence given to support the proposed rates specifically for this product, and, in particular, why a rate of 15 p.c. was required under the B.P. Tariff.

The Industry Committee stated that it had received a report that some polystyrene foam is imported under tariff item 192, which refers generally to roofing materials and insulation manufactured wholly or in part of vegetable fibres, n.o.p. Polystyrene foam board for use as roofing or insulation would be classified under item 192 if any vegetable fibre is incorporated into the product, but under the B.T.N., products containing such fibres but retaining essentially the characteristics of polystyrene foam would remain in Chapter 39. The Committee recommended that the tariff provision for any polystyrene foam now classified under item 192 be relocated with the existing rates of duty, 15 p.c., B.P., and 20 p.c., M.F.N., under an item based on heading 39.02, in order to maintain the completeness of the B.T.N. structure. It is unlikely, however, that heading 39.02 would provide for many of the products now classified under item 192.

Polystyrene Film and Sheet

During the course of the hearing, it was reported that polystyrene film is not produced in Canada, but that polystyrene sheet is made here. Polystyrene sheet extrusion followed by moulding is one of the methods by which polystyrene resins are manufactured into end products. In recent years, the D.B.S. has conducted special surveys of the manufacturers of polyethylene, polyvinyl chloride and polystyrene film, sheet and lay-flat tubing. The figures for polystyrene for 1960, 1961 and 1962 cover information obtained from: Korlin Limited, Stratford, Ont.; Micro Plastics Division, Building Products Limited, Acton, Ont. and

⁽¹⁾ Transcript, Vol. 135, p. 20102

G.M. Plastics Corporation, Granby, P.Q. In 1963, figures from Dow Chemical of Canada Ltd. were included with those from the other three firms. For 1960 and 1961, the survey covered material over 5 mils in thickness; in 1962, 1963 and 1964, over 3 mils in thickness.

Production and Shipments of Polystyrene Sheet,
(Plain Undecorated "Sheeting"), 1960-64)

	<u>Production</u>	<u>Shipments</u>		
	'000 lb.	'000 lb.	\$'000	\$/lb.
1960	..	3,644	1,647	.45
1961	..	4,326	1,855	.43
1962	5,091	5,091	1,723	.34
1963	5,382	5,360	2,008	.37
1964	7,666	7,666	2,693	.35

Source: D.B.S., Industry Division, Special Surveys

Except as noted below, no representations were received as to the appropriate rates of duties specifically for these products. However, W.R. Grace & Co. of Canada Limited, Cryovac Division, in a general submission indicated its interest in a form of polystyrene sheet used to make food package trays. According to the company, it required "oriented" polystyrene sheets, not made in Canada and imported at that time free of duty under tariff item 905(f)1. The company proposed duty-free entry, a nominal rate of duty or a duty-free quota on imports for all resins and films not made in Canada, for a fixed period. The company also expressed the view that no rates higher than 20 p.c. can be supported and that no rates higher than 10 p.c. are needed to exclude products competitive with those made in Canada.(1) If rates on resins were raised, it was the company's belief that corresponding increases in rates would be required on Canadian-made films and sheets, but rates on film and sheet should be no higher than resin rates as this would be sufficient protection for the efficient manufacturer. In 1965, the company was reported to be constructing a plant at Brantford, Ont. to produce oriented polystyrene sheets.(2) In its submission on photographic base films, Canadian Kodak Company Limited mentioned that it had used polystyrene film but made no proposals concerning rates of duty for it.(3)

Polystyrene Emulsions

Polystyrene emulsions are produced by the polymerization of styrene monomer in an aqueous medium, with surface-active agents and protective colloids. The emulsions are made by a batch process in a number of different forms, varying in polystyrene content from about 35 to 55 per cent. It is not practical to convert the emulsion to a dry polystyrene resin or the dry resin to the emulsion form. The

(1) Transcript, Vol. 136, p. 20236

(2) Financial Post, May 1, 1965, p. 10

(3) Transcript, Vol. 160, p. 23770

emulsions are principally used in the manufacture of self-polishing floor waxes.

These emulsions are produced in Canada for merchant sale by Reichhold Chemicals (Canada) Limited and Polyresins Limited, both of Toronto, Ontario and by T.F. Washburn (Canada) Limited, Preston, Ontario. The first two-named made submissions to the Board. A large manufacturer of floor polishes, S.C. Johnson and Son Limited, Brantford, Ontario, produces polystyrene emulsions for its own use.

The spokesman for Polyresins Limited estimated that the total Canadian market for polystyrene emulsions is about 5 million pounds a year.⁽¹⁾ At the price cited, of 16 cents per pound for emulsions of 36 per cent solids, in tank wagon quantities, delivered, this annual consumption would be valued at about \$800,000. The spokesman further stated that there is more than sufficient capacity to meet the needs of the market and that any form of the emulsion required in this country can be produced here. Problems of excess capacity were said to be alleviated by the fact that, to some extent, the equipment used in the production of these emulsions can also be used to make other products.

No import statistics are available, but the representative of Polyresins Limited estimated that imports from the United States supplied 40 to 50 per cent of the Canadian market at prices, expressed in Canadian funds, that were virtually the same as for domestically produced emulsions. Both he and the spokesman for Reichhold Chemicals attributed the large share of the Canadian market held by imports to the use of U.S. formulations by companies which are subsidiaries of U.S. manufacturers of floor polishes.

Polystyrene emulsions are classified under tariff item 901(b)5 at rates of $7\frac{1}{2}$ p.c., B.P., and $7\frac{1}{2}$ p.c., M.F.N. Both Polyresins and Reichhold recommended increased rates. In its submission, which dealt with a wide variety of products, Reichhold indicated that it was in substantial agreement with the general rate proposals placed before the Board and referred to above. Polyresins Limited dealt specifically with polystyrene emulsions and polyvinyl acetate emulsions, for which it suggested rates of 15 p.c., B.P., and 20 p.c., M.F.N. The company indicated that it did not require the 25 p.c. rate proposed to the Board for heading 39.02 and that its own proposal would be adequate to serve its needs. No recommendations relating specifically to polystyrene emulsions were received from consumers.

The principal argument advanced in support of the proposals by the Canadian producers was that an increase in duties was required to induce the subsidiaries of U.S. firms to substitute Canadian-made emulsions for the U.S. products specified in the formulations of the parent companies. It was claimed that the change in the exchange rate and the surcharges which were in effect at that time were having this desired effect to some degree.

The companies also suggested that they encountered freight disadvantages in serving some parts of the market because U.S.

⁽¹⁾ Transcript, Vol. 135, p. 20144

producers were located closer to some consuming points outside Ontario and Quebec. The companies also noted that, with a duty of $7\frac{1}{2}\%$ p.c., their products bore a lower rate than the 15 p.c., B.P. and 20 p.c., M.F.N., applicable to their principal raw material, styrene monomer. No indication was given, however, that they import any of their requirements of styrene monomer or of the extent to which the price of Canadian monomer reflected the rates of duty.

Acrylonitrile-Butadiene-Styrene (ABS) Terpolymers

These resins, based on combinations of acrylonitrile, butadiene and styrene, are produced either by mechanical or latex blending of styrene-acrylonitrile resins with butadiene-acrylonitrile rubbers or graft rubber polymers or by the polymerization of the basic raw materials to form homogeneous terpolymer resins.

The resins, generally known as ABS resins, are noted for their combination of high impact strength, tensile strength, rigidity and hardness, with a very broad range of temperature usefulness. Chemical resistance and electrical properties are also very good. They are used in the manufacture of telephone housings, handles, receivers, transmitter caps and other telephone components, also to make appliances, jugs, plumbing pipes, fittings and tanks and automobile instrument clusters.

The Canadian market has grown rapidly in recent years and it was estimated that consumption would double between 1963 and 1966 to reach 10 million pounds, valued at more than \$4 million.⁽¹⁾ Since it was not until 1964 that ABS resins were made in Canada, the size of the market prior to that year is reflected in the level of imports. These statistics are available from January 1, 1962:

Imports of ABS Resins, 1962-64

	'000 lb.	\$'000	\$/lb.
1962	3,496	1,577	.45
1963	5,084	2,292	.45
1964	5,544	2,380	.43

Source: D.B.S., Trade of Canada, Imports

These imports of ABS have come almost entirely from the U.S.A. Canadian Plastics reported production in Canada in 1964 of 4 million pounds and exports of 2 million pounds, suggesting consumption in Canada of about 7 million pounds in that year.

Early in 1964, Polymer Corporation Limited and Monsanto Canada Limited were reported to have begun commercial production of ABS resins in Canada, the former at Sarnia, Ontario and the latter at LaSalle, Quebec. The planned capacity of the Monsanto plant was

⁽¹⁾ Chemistry in Canada, Mar. 1964, Vol. 16, No. 3, p. 21

reported to be 7 million pounds annually. It has also been reported that Dow Chemical of Canada Limited is to make the resins at Sarnia and that the Marbon Chemical Division of the Borg-Warner (Canada) Corporation is producing ABS resins at Cobourg, Ontario. Another source has reported that Dow Chemical of Canada is making materials described as styrene-acrylonitrile-butadiene formulations, claimed to have physical properties and chemical resistance superior to those of conventional ABS resins.⁽¹⁾

ABS resins without admixture are entered free of duty under both the B.P. and M.F.N. Tariffs under item 901(a)9. Moulding compounds also free of duty under both Tariffs under item 902(f).

Northern Electric Company Limited, which imports ABS moulding powders for use in the manufacture of telephone housings, proposed free entry for ABS resins in lumps, powders, granules or flakes until such time as they are made in Canada.⁽²⁾ The company made no proposal concerning appropriate rates when the resins are ruled to be made in Canada. The Rubber Association of Canada, in its general submission on plastics, requested that there be no changes in the present rates of duty on materials used by its members, and mentioned specifically ABS resins.⁽³⁾ In addition to these proposals, the general submissions for the chapter or for heading 39.02 have relevance. In the main, these proposed rates of 25 p.c., B.P. and M.F.N., with a minimum of 5 cents per pound, or 15 p.c., B.P. and 20 p.c., M.F.N., with or without a minimum rate of 5 cents per pound for "made in Canada" products or for all products of the heading; there were also a number of proposals for the continuation of the existing rates.

The Department of National Revenue, effective June 19, 1964, ruled ABS terpolymer resins and moulding compounds to be of a class or kind made in Canada.

Styrene-Maleic Anhydride Copolymer Resins

These resins, copolymers of styrene and maleic anhydride, are not produced in Canada. They are imported for use in the textile industry as a warp-sizing compound to facilitate weaving of man-made fibres or as a finishing agent, and also for use in the manufacture of self-polishing floor waxes as a levelling agent, or for further processing into methyl methacrylate-styrene-maleic anhydride copolymer resins for such waxes.

Styrene-maleic anhydride copolymers, in lumps, powders, granules or flakes, are soluble in aqueous ammonia. In the waxes in which they are used, they represent 25 to 30 per cent of the cost of the formulations. In the textile field, they are used in powder or paste form, but could be imported in powder and made into paste in Canada if there were any tariff advantage in so doing. The textile industry estimated the value of its annual consumption of these resins

(1) Chemical Week, Feb. 22, 1964, Vol. 94, No. 8, p. 65

(2) Transcript, Vol. 150, p. 22379

(3) Same, Vol. 123, p. 18405

at about \$250,000.(1) The only source of imports mentioned at the hearings was the U.S.A.

These copolymers, without admixture, when styrene is the predominant monomer, are dutiable under tariff item 901(a)5, at rates of $7\frac{1}{2}$ p.c. under both the B.P. and M.F.N. Tariffs. When the maleic anhydride predominates, they are free of duty under item 901(a)9. The manufacturers of floor polishes indicated that their material was entered under the latter item,(2) while the textile industry suggested that both tariff items were applicable.

Both the Canadian Manufacturers of Chemical Specialties Association, speaking on behalf of the manufacturers of self-polishing floor waxes, and the Canadian Textiles Institute, speaking for consumers in the textile industry, recommended that provision be made for free entry until such time as there is Canadian production, for styrene-maleic anhydride copolymer resins in lumps, powders, granules or flakes, soluble in aqueous ammonia. The proposal of the Canadian Manufacturers of Chemical Specialties Association was basically an end-use proposal, for use in the manufacture of waxes. This Association indicated that it would accept the application of rates of 15 p.c., B.P., and 20 p.c. M.F.N., if these resins should become made in Canada;(3) the Canadian Textiles Institute expressed no firm views on this point.

In its submission under B.T.N. heading 39.01, Schenectady Varnish Canada Limited indicated that it disassociated itself from the views of the Canadian Manufacturers of Chemical Specialties Association.(4) Schenectady Varnish Canada Limited produces competitive alkali-soluble resins in Canada and recommended uniform rates of 15 p.c., B.P. and 20 p.c., M.F.N., for products of headings 39.01 and 39.02. The company would be prepared to see exceptions made for products not made in Canada, but only if there is no Canadian production of identical products or of products satisfactory for substitution over a substantial area of use. Apart from those who would make no exceptions to the heading rates, there was no other opposition to the proposed free entry of styrene-maleic anhydride copolymer resins.

If these copolymers exist as condensation products, they likely would be more properly classified under B.T.N. heading 39.01; presumably the proposals referred to above would be intended to cover such change in classification.(5)

Other Styrene and Styrene Copolymer Resins

It was indicated to the Board during the course of the hearings that there were a number of other styrene and styrene copolymer resins, not now made in Canada, which are imported. For these, it was recommended by interested parties either that free entry be provided or that there be no change in the rates now applicable. Those in

(1) Transcript, Vol. 163, p. 24181

(2) Same, Vol. 148, p. 22071

(3) Same, Vol. 148, p. 22065

(4) Same, Vol. 127, p. 18935. 18974

(5) Same, Vol. 163, p. 24177

which styrene predominated are classified as polystyrene-type resins; the others are classified as "other type".

Styrene-acrylonitrile resins were reported as being used in Canada to the extent of about a half million pounds annually.⁽¹⁾ In its general brief on plastics, the Rubber Association of Canada opposed any increases in rates on products used by its members, including styrene-acrylonitrile resins. The Association indicated that it opposed increases on the grounds that the plastics industry was expanding and flourishing under the existing tariff structure, that duties should be kept low so that Canadian manufacturers could keep abreast of technological advances in the U.S.A., and that proposed increases would "inflict crippling cost increases on rubber manufacturers engaged in the production of plastics and plastic products and would seriously restrict the rubber industry's further expansion in the field of plastics production",⁽²⁾ and would result in sharp increases in the price of plastics products. Monsanto has announced its intention of building a plant at LaSalle, Que., capable of producing annually about one million pounds of styrene-acrylonitrile resins.⁽³⁾

Pennsylvania Industrial Chemical Corporation proposed no change in rates of duty for the products which it supplies to the Canadian market.⁽⁴⁾ The company included in its list of products a number of styrene resins of low molecular weights, under 2000, which are used in paints, asphalt floor tile, rubber compounding, adhesives, concrete curing, paper coating, etc. It was said that these products, which are also produced by other U.S. firms, could not be used for foaming, moulding or extruding. In particular, the company mentioned:

- (a) styrene copolymers, defined as selected polymers of crude styrene with molecular weights much lower than the moulding grades of polystyrene;
- (b) styrene homologs defined as substitute styrene copolymers completely saturated and aromatic, derived from the polymerization of alpha methyl styrene;
- (c) styrene-acrylonitrile-indene terpolymers, a series of terpolymers of crude indene-styrene fractions further reacted with acrylonitrile, of relatively low molecular weight.

The company also referred to modified styrene resins but furnished no further particulars concerning these. The company also expressed an interest in all its resins when in organic solvents.

In commenting on this submission, the Industry Committee indicated that problems of definition would arise in distinguishing most of the products shipped to Canada by Pennsylvania Industrial Chemical Corporation from Canadian produced resins. This would apparently apply to all the styrene resins with the probable exception of the styrene-acrylonitrile-indene terpolymers. No definitions or

(1) Transcript, Vol. 134, p. 20050

(2) Same, Vol. 123, p. 18400-1

(3) Chemistry in Canada, March, 1965, p. 30

(4) Transcript, Vol. 135, p. 20170

wordings suitable for tariff purposes have been suggested either by the company or the Committee. The company did suggest that distinctions might be based on molecular weights. At the time of the hearing, the Canadian market for these specialty resins was believed to be small.

Styrene-Butadiene Latices

These latices are in the form of a white opaque liquid, consisting of a dispersed (butadiene-styrene) resin and water. The latex particles are minute in size and spherical in shape. The product is manufactured by the reaction of styrene and butadiene with catalysts and additives and the removal of excess unreacted styrene and butadiene. As sold, latex contains approximately 50 per cent solids and it is shipped as a liquid in drums, tank trucks or tank cars and sometimes in special tanks on ships.

To make them suitable for varying uses, latices are produced with different proportions of butadiene and styrene. As the Customs Tariff is at present administered, not all of the latices would be within the terms of Reference 120; those having a styrene content of less than 50 per cent of the solids content are now administered as being synthetic rubber under tariff item 616(4) and are free of duty under all Tariffs. Only those with a solids content of 50 per cent or more by weight of styrene are now classified as synthetic resins and, therefore, in the Reference. In the following discussion, references to percentages of styrene and butadiene are to be understood to refer to percentages by weight of the solids content.

Latices containing more than 40 per cent by weight of styrene are produced in Canada by Dow Chemical of Canada Limited. Polymer Corporation Limited produces latices containing less than 50 per cent styrene. Both firms produce these latices at Sarnia, Ontario. As the Polymer product is not within the terms of Reference 120, this firm made no detailed submission to the Board.

The spokesman for Dow Chemical indicated that his company's product varied from about 45 per cent to about 60 per cent styrene, depending upon the use for which it is designed; thus, some portion of the Dow production is also not within the scope of the Reference. The principal market for the product of Dow Chemical is in the manufacture of interior paints, where the latex is the adhesive which binds the pigment particles together and to the surface being painted. In this use and also in the paper industry, where the product is used as an adhesive to bind clay or other pigments to paper or paperboard to improve the appearance and printability, latices are required which contain more than 50 per cent styrene. Those containing a smaller proportion of styrene are used by the textile industry to coat the backs of rugs and upholstery; Dow and Polymer compete in this market. A minor use of latex is as an additive to Portland cement to produce stronger concrete.

At the public hearing, Dow Chemical stated that latices were sold in Canada at prices varying from 27 to 32½ cents per pound of solids, in tank cars, delivered; one cent per pound is added for shipments to British Columbia. The price varies depending upon the

formulation required. Prices in drum quantities are approximately five cents per pound higher than for tank cars or trucks. A trade publication indicated that published prices have been relatively stable in recent years; one paint grade quoted at 30 cents per pound of solids in 1959 and 1960, fell to 28½ cents in 1961, but was 29½ cents in 1964.(1) U.S. published prices are comparable to those in Canada, the same grade as mentioned above having been quoted, at least since 1961, at 27½ cents per pound of solids, f.o.b. shipping point, tank cars, minimum transportation prepaid.(2)

The spokesman for Dow Chemical estimated that latices imported by other firms held less than 5 per cent of the market in which his company is interested. He also stated that Dow imported new formulations from its parent company to develop their use in Canada prior to starting manufacture in this country. All imports were believed to be coming from the U.S.A. Dow exports some of these latices; the principal market is the United Kingdom, but there have been shipments to Australia.(3)

As indicated above, styrene-butadiene latices containing more than 50 per cent butadiene are free of duty under all Tariffs under tariff item 616(4), an item not referred to the Board. Those containing more than 50 per cent styrene are dutiable at 7½ p.c. under both the B.P. and M.F.N. Tariffs under tariff item 901(b)5; any latex containing 50 per cent butadiene and 50 per cent styrene would be duty-free under tariff item 901(b)8.

In the Brussels Tariff Nomenclature, those styrene-butadiene latices meeting the criteria established for synthetic rubber are classified under heading 40.02: "Synthetic rubber latex; pre-vulcanised synthetic rubber latex; synthetic rubber; factice derived from oils." Those not held to be synthetic rubber would be under heading 39.02. The Board has not been able to establish exactly the correspondence between the present administration of the tariff classification of these latices as rubber or resin and the distinction between the two headings in the B.T.N.

In the belief that all styrene-butadiene latices would be classified under heading 40.02, Dow Chemical proposed that a separate tariff item be established to be worded: "Synthetic latexes, styrene type, when containing more than 40 per cent styrene by weight." It was intended that this should mean more than 40 per cent by weight of the solids content. The proposed rates were the same as for the company's other plastics products, 15 p.c., B.P. and 20 p.c., M.F.N., with a minimum of 5 cents per pound under both Tariffs.(4) In its submission on these latices, Dow Chemical did not present arguments specifically in support of the proposed rates, in accordance with its previous statement that its arguments were covered in its general submissions on organic chemicals and plastics. It was indicated, however, that there is no "off-grade" problem in this field. The item proposed by Dow Chemical goes beyond tariff item 901(b)

(1) Canadian Chemical Processing - various issues

(2) Chemical and Engineering News - various issues

(3) Transcript, Vol. 136, p. 20365

(4) Same, Vol. 136, p. 20344

as at present administered, and would cover some latices now considered to be synthetic rubber.

In commenting on the Dow submission, Polymer Corporation Limited stated that it had no interest in the latices now classified under tariff item 901(b), but that it wished no changes made that would result in products now classified as synthetic rubber being made dutiable or being classified as synthetic resins.⁽¹⁾ This in effect opposed the Dow proposal in so far as it relates to latices containing between 40 and 50 per cent styrene.

The Rubber Association included mention of styrene-butadiene in a more general submission opposing increases in rates of duty on materials used by its members.⁽²⁾

At the present time the one Canadian producer supplies most of the market for the latices in which it is interested, although it has some competition from Polymer in an area not properly within the Board's terms of Reference. No indication is available as to whether imports other than by Dow Chemical are of forms now classified as synthetic rubber or as synthetic resin.

POLYVINYL RESINS

The vinyls are a group of thermoplastic resins made up of several polymers, including those of vinyl chloride, vinylidene chloride, vinyl acetate and vinyl alcohol, as well as a number of copolymers. Polyvinyl chloride (PVC) is the name given to those particular vinyls derived entirely from the vinyl chloride monomers (homopolymers) or are copolymers of at least fifty per cent vinyl chloride together with other monomers, the most common being vinyl acetate.

Polyvinyl Chloride

The Product

PVC is by far the most important of all the vinyls both in volume of production and diversity of use. The commercial market for the basic resins is estimated to be in excess of 100 million pounds a year, having a value of more than \$20 million. The plastic is a tough, abrasion and fire-resistant material, non-toxic, odourless and tasteless. It has excellent electrical properties and a high degree of resistance to acids, alkalis, and alcohols.

Polyvinyl chloride resin is produced by the polymerization of vinyl chloride, a monomer derived from ethylene dichloride, or acetylene and hydrogen chloride. The polymerization process involves the application of heat, pressure and catalysts, and the conditions of the reaction may be adjusted to produce a variety of resins with qualities adapted to specific uses. The resins are usually compounded

⁽¹⁾ Transcript, Vol. 136, p. 20372-3

⁽²⁾ Same, Vol. 123, p. 18404

with other materials such as plasticizers, stabilizers, fillers and lubricants and are made available in a wide range of colours. General purpose resin, normally a homopolymer, is produced in the largest volume and in a variety of molecular weights. The higher molecular weight resins are commonly used in plasticized form for wire covering, calendered film and sheeting and flexible extrusions. The intermediates are used in film and sheeting and in rigid (unplasticized) applications, particularly pipe. The lower molecular weight resins are required in the manufacture of floor tiles and phonograph records. Among the many other grades of PVC resins are the solution-type copolymers used in specialty lacquers and in other protective coatings for their high abrasion and chemical resistance. Vinyls dispersed in organic liquid, organosols or plastisols, are used for dip coating of many articles from dish racks to work gloves, for women's overshoes, dolls, and a variety of other products.

The Industry

The PVC industry in Canada includes the manufacturers of resins and other primary PVC products; the moulders of such materials; those engaged in calendering, casting or extruding film and sheet; the printers of sheeting; fabricators; the manufacturers of reinforced PVC materials and the laminators. Within this context, the producers of resins and compounds form the primary sector of the industry. At the time of the public hearings in May 1963, three companies were manufacturing the resins: B.F. Goodrich Limited, Monsanto Canada Limited and Shawinigan Chemicals Limited. Canadian production first began early in World War II, when Shawinigan Chemicals Limited was encouraged to produce PVC resins for cable insulation and other uses formerly supplied by rubber. Since there was no time for research, a new company, Canadian Resins and Chemicals Limited, was formed jointly with Union Carbide of the U.S.A. to use Shawinigan's raw materials and plant site and Union Carbide's process design and "know-how".⁽¹⁾ The plants to produce the monomer and resins were built at Shawinigan, Quebec where acetylene, the basic raw material for the monomer, was available and where hydrogen chloride could be made from local chlorine. In 1959, Canadian Resins and Chemicals Limited became a division of Shawinigan Chemicals when the latter company purchased Union Carbide's interest. Although official figures on plant capacities are not published, one trade journal estimated that by 1966, including the new plant of Imperial Oil, capacity would be approximately 140 million pounds, divided fairly evenly among the four companies.⁽²⁾ However, other trade sources have estimated the total as high as 160 million pounds by 1966, principally as a result of higher estimates of Imperial Oil's anticipated capacity.

Shawinigan Chemicals was the only Canadian manufacturer of polyvinyl chloride resin until 1950 when Monsanto Canada Limited began production at its plant in Montreal, Quebec. Initially, Monsanto's monomer supplies were obtained from Shawinigan but, since 1960, the company has been purchasing its vinyl chloride requirements from Dow Chemical of Canada Limited at Sarnia, Ontario, which uses an ethylene-

(1) Transcript, Vol. 44, p. 6511

(2) Canadian Plastics, February 1966, p. 35

based process for the production of the monomer. Monsanto's plant capacity was reported by trade sources in 1964 as being about 10 million pounds per annum.⁽¹⁾ It was also reported that the company had completed an expansion at the end of 1963, with further plans to double its plant capacity by late 1964.⁽²⁾

A third resin producer, B.F. Goodrich Chemical Division of B.F. Goodrich Canada Limited, commenced operations at Welland, Ontario, in 1956 with monomer imported from its parent company in the U.S.A. Recently B.F. Goodrich, like Monsanto, has been buying its monomer from Dow Chemical in Sarnia, Ontario. The plant capacity at Welland was said to be about 15 million pounds of resin per year in 1963. In April 1964, a two-phase expansion project was reported to first increase the company's production of polyvinyl chloride resins by approximately 50 per cent and, then, by late 1965, almost double the 1963 facilities.⁽³⁾

Estimates given at the public hearing indicated that the total capacity of the three resin producers in 1963 was of the order of 60 million pounds per annum.⁽⁴⁾ Both Monsanto and Goodrich stated that Canadian PVC manufacturers were operating at capacity levels in 1963. With new developments in the use of PVC resins such as in the manufacture of pipe, construction materials and blow-moulded bottles, the industry is at present experiencing an unprecedented expansion. In addition to the reported increases in resin capacities by the three established manufacturers, Imperial Oil Limited is reported to be building a PVC resin plant at Sarnia, Ontario, rated at about 45 million pounds per year capacity. An estimate of Canadian capacity following these developments was given by a trade publication at about 142 million pounds by July 1965, distributed as follows:

Production Capacity of PVC Resin

<u>Company</u>	<u>Plant Location</u>	<u>July 1964</u> million pounds per year	<u>July 1965</u>	<u>Jan. 1966</u>
Shawinigan Chemicals, Limited	Shawinigan, Que.	32	40(a)	50(a)
B.F. Goodrich Chemical Division	Welland, Ont.	15	22	30
Monsanto Canada Limited	Montreal, Que.	18	35	35
Imperial Oil Limited	Sarnia, Ont.	0	45	45
Total		65	142	160

(a) Probable expansions

Source: Canadian Chemical Processing, July, 1964

(1) Chemical Week, June 13, 1964, p. 51

(2) Transcript, Vol. 44, p. 6511-5

(3) Canadian Plastics, April, 1964, p. 42

(4) Transcript, Vol. 153, p. 22676

This remarkable degree of expansion undoubtedly reflects primarily the expectations of substantial future increases in the demand for PVC resin, but it also reflects the fact that in recent years the capacity of Canadian producers has apparently fallen behind the level of Canadian consumption of this product.

The other segment of the primary sector of the industry comprises the compounders who blend the basic PVC resins with materials such as plasticizers and stabilizers. PVC resin is different from polyethylene and polystyrene and must almost invariably be compounded with other materials before it can be fabricated into film, sheet, pipe and other products. All of the three resin manufacturers are engaged in compounding and two other firms produce large quantities of PVC in this form from basic resins which they import or purchase domestically.

Producers of PVC Compounds in Canada

	<u>Plant Location</u>
B.F. Goodrich Ltd.	Kitchener, Ontario
Monsanto Canada Ltd.	Montreal, Quebec
Shawinigan Chemicals, Ltd.	Shawinigan, Quebec
Carlew Chemicals Ltd.	Montreal, Quebec
Kayson Plastics & Chemicals Ltd.	Preston, Ontario

Source: Transcript, Vol. 153, p. 22676

Apart from those mentioned above, there are other companies which carry out blending operations on a minor scale for specific uses. One of these, Diamond Alkali (Canada) Ltd., is reported to be constructing a PVC compounding plant at Toronto, Ontario, to provide dry-blend compounds to fabricators of rigid pipe, blow-moulded items and other products.⁽¹⁾

Of the firms engaged in the primary PVC industry in Canada only the resin producers appear to have extended their operations on any large scale into further processing. Shawinigan Chemicals is said to be fully integrated from the primary resin production to end products, while Monsanto's operations cover resin production, compounding and the manufacture of film, sheeting, foam and PVC coated fabric. In addition to participating in the manufacture of PVC resin and compounds, B.F. Goodrich Canada Limited manufactures a variety of extruded PVC finished products. It should be noted also that soon after Imperial Oil announced its entry into the PVC resin manufacture, it reported the purchase of Building Products Limited which makes a wide range of building products including PVC floor tile. Thus, developments in the PVC industry indicate a tendency on the part of the relatively large firms towards a greater integration of operations.

The Market

Resins

The Canadian demand for polyvinyl chloride resin has experienced a considerable expansion in recent years. Consumption, estimated at about 39 million pounds in 1957, had doubled by 1962 reaching more than 75 million pounds, an average growth rate of about 20 per cent

(1) Canadian Chemical Processing, May, 1964

per year; it probably reached 100 million pounds in 1964 and might amount to 120 million pounds in 1966. It is expected that the market will continue to expand rapidly, especially in the light of important new uses for PVC resin such as in building materials and blow-moulded bottles. This rate of growth in the market for the resin in Canada apparently outstripped available capacity, and a substantial part of the very large imports of the resin in recent years may have been necessary to supplement Canadian production.

The uses of PVC are many and varied. The wire and cable industry is one of the major users of the resin and, along with the extruders and moulders of such products as garden hose, gaskets and electrical fittings, consumed about 37 per cent of the total in 1962. The floor tile industry, the largest single consumer, used about 28 per cent, and another 20 per cent was employed in making calendered film, sheeting and coated fabric. The remaining 15 per cent found various other uses.

Approximate Pattern of Consumption of Polyvinyl Chloride Resin
and Copolymers in Canada, 1962

	<u>1962</u> '000 lb.	<u>Percentage</u> <u>distribution</u> %
Calendered film, sheeting and coated fabric	16,000	20
Flooring	22,500	28
Wire and cable, extrusion, moulding	29,500	37
Plastisol coated textiles	3,500	5
Plastisol moulding and other plastisol	4,000	5
Protective coatings	1,500	2
Other uses	<u>2,000</u>	<u>3</u>
Total resins and compounds	79,000	100

Source: Estimates based on D.B.S. published data in Catalogue No. 46-211 and data in Canadian Plastics, February, 1963

As with other major plastics, the principal market for PVC resin is in Ontario and Quebec, and probably about 95 per cent of the total Canadian consumption of the resin is in these two provinces.⁽¹⁾

Canadian requirements are supplied both from domestic production and imports. These two sources of supply are discussed separately on the following page.

⁽¹⁾ Transcript, Vol. 153, p. 22678

Factory shipments of polyvinyl chloride resin experienced a growth of over 70 per cent in four years from nearly 30 million pounds in 1957 to nearly 52 million pounds in 1961. A decline in shipments in 1962 reflected a labour strike which closed Shawinigan's resin plant during the fourth quarter of 1962 and part of the first quarter of 1963. The most recent available data suggest that in 1964 Canadian shipments moved sharply upwards. The shipments, however, might include some double-counting. In 1964, for example, it seems probable that Canadian production of the basic resin, on a net, dry resin basis, was closer to 65 million pounds than to the 76 million pounds of shipments recorded in the following table.

Factory Shipments of Polyvinyl Chloride Resins, 1957-64

	<u>'000 lb.</u>	<u>\$'000</u>	<u>\$/lb.</u>
1957	29,878	9,339	.31
1958	34,597	9,936	.29
1959	41,245	10,886	.26
1960	38,862	10,013	.26
1961	51,510	12,412	.24
1962	49,505	10,624	.21
1963	53,504	10,670	.20
1964	76,215	..	..

Source: D.B.S. Manufacturers of Plastics and Synthetic Resins, Cat. No. 46-211 and Cat. No. 46-002 (monthly) for 1964

Foreign Trade

Data concerning trade in PVC resins are extremely sketchy. D.B.S. figures on imports have only been available since 1962 and exports are not published separately.

D.B.S. data indicate that Canada's imports of PVC resins in 1962 were about 32 million pounds, increasing to 34 million in 1963 with a further increase to nearly 43 million in 1964, valued at \$8.4 million. Incomplete data suggest that in 1965 imports continued at about the level of 1964. In 1964 imports supplied about one-third of Canada's requirements; it is probable that as the expanded capacity comes into production, imports will come to supply a smaller proportion of the total.

Some imports were said to be of a kind not produced in Canada, but the spokesman for Shawinigan Chemicals estimated that 90% of the total were of types ordinarily available domestically.⁽¹⁾

⁽¹⁾ Transcript, Vol. 151, p. 22473

Imports of Polyvinyl Chloride Resins,
1963 - 64

Country	1963		1964		
	'000 lb.	\$'000	'000 lb.	\$'000	\$/lb.
United Kingdom	1,325	247	767	139	.18
France	1,846	286	2,992	504	.17
Italy	3,997	548	6,899	993	.14
Japan	6,332	742	2,889	338	.12
United States	19,695	4,414	28,890	6,412	.22
Other	975	143	338	59	.17
Total	34,171	6,381	42,774	8,446	.20

Source: D.B.S., Trade of Canada, Imports

In 1964, about 68 per cent of imports originated in the United States, 16 per cent in Italy, 7 per cent in each of France and Japan and 2 per cent in other countries including Britain, West Germany and Yugoslavia. In 1963, almost all of the polyvinyl chloride resin was imported into the provinces of Ontario and Quebec; very small amounts came into Nova Scotia, New Brunswick and British Columbia. Imports obviously are a large part of the total supply but, given Canadian capacity and production in 1962, 1963 and 1964, it seems probable that a substantial part of the imports was necessary to supplement domestic supply. Although prices of some imported resins appear to be lower than local prices, most imports were from the U.S.A. at an average value higher than that for imports from other countries and higher than the reported Canadian price for basic resin.

Exports of polyvinyl chloride resin have been estimated to be between 4 million and 6 million pounds in the last few years.⁽¹⁾ The spokesman for Monsanto Canada Limited, speaking in 1963, stated that exports of resin at that time were relatively small, probably less than 5 million pounds per annum.⁽²⁾

Competitive Factors

There was considerable discussion before the Board concerning the cost position of Canadian PVC producers in relation to their competitors, particularly those in the U.S.A. It was pointed out, for example, that plant capacities in the U.S.A. vary from about 25 million pounds of resin to upwards of 250 million pounds per year, whereas Canadian plants range between 15 and 32 million pounds of resin per year. It is apparent that domestic plants are all considerably smaller than the largest U.S. plants, although planned increases should put them in the range of the small to medium-sized plants in the U.S.A. There was, however, no evidence given to the Board to indicate that Canadian resin producers or the smaller plants in the U.S.A., suffered substantial cost disadvantages because of smaller plant size. The cost of the monomer is a substantial part of the cost of producing the resin,

(1) Canadian Plastics, February, 1964

(2) Transcript, Vol. 153, p. 22680

and no significant cost disadvantage was claimed in acquiring the monomer.

Transportation is a factor of some importance, in the competitive situation. Even though potential U.S. competitors are located in Niagara Falls, N.Y. and Painesville, Ohio, an examination of the relative costs of moving resins by truck transport, the principal method of shipment, indicates that Canadian manufacturers enjoy a freight advantage to most major consuming locations in Canada. For example, the truckload rate from Welland, Ontario to Toronto and to Preston, Ontario is \$5.20 per ton, and from Montreal, Quebec to Sherbrooke, Quebec, is \$7.00 per ton, while the rate from Niagara Falls, N.Y. to Toronto is \$12.40 per ton, to Montreal \$24.60 per ton and to Sherbrooke, Quebec \$26.80 per ton.⁽¹⁾ This comparative freight advantage provides a differential of one to two cents per pound in favour of the Canadian producer, a significant amount considering the price of the product.

All in all, the Board has not sufficient information to indicate the overall cost advantage or disadvantage which the companies in Canada have in supplying the Canadian market, or what price for polyvinyl chloride resin represents an unprofitable level for these companies. The evidence is, however, that with the prices of the past two or three years, Canadian producers have found reason to expand greatly production facilities.

Pricing Policy and Prices

Generally, PVC resin is sold on a delivered basis at a range of prices that reflect the wide variety of resins available. Since about 70 per cent of total consumption is "general purpose resin", prices are most commonly quoted for this type. Canadian prices on the major resin grades were nearly 39 cents per pound in 1954; by 1962, they had dropped to 16 cents per pound and a further drop to about 15 cents per pound was reported in January 1964.⁽²⁾ This trend has followed the steady, world-wide reduction in prices of polyvinyl chloride resins. By May 1963, prices appear to have been stabilized in the U.S.A. at about 15 cents per pound, as producers attained a better balance between supply and demand. By the second quarter of 1964, in both Canada and the U.S.A., prices had become firmer, and were 15.5 to 16 cents per pound in 1964, 1965 and early 1966.

At the public hearing, it was said that the early price reductions helped to expand the usage of PVC resins and performed a useful function for the producers as well as the users.⁽³⁾ However, concern was expressed at the persistent decline, and it was stated that prices of less than 15 cents per pound were unprofitable. The spokesman for B.F. Goodrich commented that "We can live with 17 cents, and we think we can sell against the current prices."⁽⁴⁾

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- (1) Smith Transport Ltd. and Husband Transport Ltd., Published Truck rates
 - (2) Transcript, Vol. 151, p. 22401; Canadian Chemical Processing, January, 1964, p. 10
 - (3) Transcript, Vol. 151, p. 22408
 - (4) Same, Vol. 153, p. 22805

Representative Polyvinyl Chloride Resin Prices in Various Countries,
1954-66

	Canada	U.S.A.	Italy	
	Delivered(a)	Delivered(b)	Locally	
			Delivered	Japan(c)
	Cdn. ¢ per lb.	U.S. ¢ per lb.	U.S. ¢ per lb.	Cdn. ¢ per lb.
1954	38.9	38.0	..	..
1955	33.1	31.0	..	..
1956	28.9	27.0	..	..
1957	24.7	27.0	..	15.2
1958	23.4	23.5	..	15.7
1959	21.9	23.5	..	14.3
1960	19.7	22.0	..	14.1
1961	18.1	17.0	..	13.7
1962	16.1	16.0	15.2	12.3
1963	15.0	15.0	15.2	11.7
1964	16.0	16.0	16.7	11.7
1965(July)	15.5	..	..	..
1966(Jan.)	15.5	..	..	..

- (a) General purpose resin, truckload or carload quantities, based on Shawinigan Chemicals average sales in Canada, 1954-1962; Canadian Chemical Processing, 1963-1966
- (b) Published price schedule of a leading U.S. producer, truckload or carload quantities
- (c) 1957-1962: average annual price of resin shipments to Canada c.i.f. Canada; 1963, 1964: average value per pound based on D.B.S. import data

Source: 1954-62: Transcript, Vol. 151, p. 22407, for all countries except Italy; later years, Canadian Chemical Processing and Chemical & Engineering News; prices in Italy are from European Chemical News

D.B.S. import statistics indicate that in the main in recent years, the average value of imports f.o.b. point of shipment, was lowest from Italy, Japan and Yugoslavia. From Italy it was 12.6¢ per pound in 1962, 13.7¢ per pound in 1963 and 14.4¢ per pound in 1964. The average value of imports from Japan was about 12.3¢ per pound in 1962 and 11.7¢ in 1963 and 1964; imports from Yugoslavia in 1964 had an average value, f.o.b. point of shipment, of 11 cents a pound, but the amount imported from that country was small. However, as noted above, most imports of polyvinyl chloride resins have been from the U.S.A. at an average value of 22 cents a pound; it was stated before the Board that these would include a considerable number of higher priced compounds and specialty grade resins. For the "general purpose resin", as noted in the table, the price in the U.S.A. was about 16¢ in 1962, about 15¢ per pound in 1963 and 16¢ again from mid 1964.

Film and Sheet

Polyvinyl chloride film and sheet (vinyl film and sheet) are normally classified as film when less than 10 mil. (10 thousandth of

an inch) in thickness and as sheeting when over 10 mil.(1) Apart from the differences in thickness, there is usually a difference in composition, vinyl sheet being more heavily pigmented than film. Both the film and sheet are manufactured by the calender process which requires that the basic resin be compounded with plasticizers, pigments, fillers and other chemicals. During the process the blended material is fed in batches into mixers where it is heated to a plastic state and then proceeds to the calender where the film or sheeting is formed.

While some vinyl film and sheet is sold as plain material, or with a simple embossed effect, the bulk of production is subjected to various operations such as laminating, embossing, printing, coating and lacquering subsequent to calendering. A wide range of consumer products is manufactured from film and sheet, including automobile seat covers, curtains, drapes, tablecloths, babyware, rainwear and others. The film and sheet produced in Canada find their main outlet in book-binding, upholstery, apparel, luggage, handbags, belts, automotive seat covers, draperies and flooring. Substantial quantities are sold as yard-goods through retail stores. The use of PVC for coated fabrics appears to be about the same as that for film and sheet. In total, the market for film and sheet in Canada in 1962 was for about 16 million pounds valued in excess of \$8 million; in 1963, it was 22 million pounds, valued at \$11 million and in 1964, 21 million pounds valued at about \$10.5 million.

The polyvinyl chloride film and sheet industry in Canada is closely related to the resin manufacturers, the coated fabrics industry and the converting trade. The major film and sheet producers were said to be four:

Plant Location

Canadian General-Tower	Galt, Ontario
Canadian Industries Limited (Fabrikoid Division)	Toronto, Ontario
Monsanto Canada Limited	Oakville, Ontario
Shawinigan Chemicals, Limited	Montreal, Quebec

Source: Transcript, Vol. 153, p. 22677

Two of these companies, Monsanto Canada Ltd. and Shawinigan Chemicals, Ltd., also produce the basic resin. Three of them, Canadian General-Tower Ltd., C.I.L. and Monsanto Canada Limited, also manufacture PVC coated fabrics, while Shawinigan, along with Canadian General-Tower, is engaged in major converting operations. The converting trade, in general, is made up of a large number of small companies equipped with stitching and electronic sealing equipment which tend to concentrate on the production of limited lines or restricted market areas.

A special survey by D.B.S. provided the following data on the volume of Canadian shipments of PVC film and sheeting in 1963 and 1964.

(1) Transcript, Vol. 156, p. 23155

Shipments of Polyvinyl Chloride Film and Sheet, 1963 and 1964

	1963			1964		
	'000 lb.	\$'000	\$/lb.	'000 lb.	\$'000	\$/lb.
<u>10 mils and under</u>						
Plain film	4,659	2,628	.56)	6,917	4,117	.60
Decorated film	1,648	1,045	.63)			
<u>Over 10 mils</u>						
Plain and decorated sheeting	<u>7,333</u>	<u>3,544</u>	<u>.48</u>	<u>7,884</u>	<u>3,177</u>	<u>.40</u>
Total	13,640	7,217	.53	14,800	7,293	.49

Source: D.B.S., special survey of Canadian Shipments of Plastic Film and Sheet

These shipments do not include the production of film and sheetings converted into other products within the same plant, which, however, was said to be of little significance. The resin content in an average film and sheet was reported to be around 60 per cent of the total weight and might amount to 35 per cent of total raw material costs, in the case of plain film, and about 25 per cent for decorated film. Most of the resin used in the manufacture of film and sheet was said to come from Canadian sources although certain grades had to be imported in order to meet particular specifications.

Data on imports of PVC film and sheet are available only from 1962.

Imports of Polyvinyl Chloride Film and Sheet, 1962-64

	1962		1963		1964		\$/lb.
	'000 lb.	\$'000	'000 lb.	\$'000	'000	\$'000	
United Kingdom	275	212	265	206	368	247	.67
Denmark	15	5	13	5	57	23	.40
France	19	10	16	9	17	9	.40
West Germany	493	251	711	359	964	431	.45
Italy	9	5	12	5	10	5	.54
Netherlands	62	23	60	20	64	22	.35
Japan	257	75	688	191	799	206	.26
Taiwan	12	3	309	63	-	-	-
United States	<u>2,899</u>	<u>1,579</u>	<u>6,151</u>	<u>3,082</u>	<u>3,805</u>	<u>2,179</u>	<u>.57</u>
Total	4,040	2,162	8,225	3,941	6,085	3,124	.51

Source: D.B.S., Trade of Canada, Imports

Although imports of polyvinyl chloride film and sheet doubled in one year from about 4 million pounds in 1962 to about 8 million pounds in 1963, they declined to 6 million pounds in 1964.

PVC imports include certain types of film not manufactured in Canada, the amount of which cannot be precisely determined. The spokesman for Canadian General-Tower Limited estimated that imports of vinyl film and sheeting of the type produced in Canada account for not less than 35 per cent of the total Canadian market.⁽¹⁾ The Board was told that sheet for automotive trim applications is largely manufactured in Canada but in many other applications, such as belts, slip covers and handbags, foreign material tended to dominate the market. In furniture upholstery, Canadian suppliers of vinyl sheeting were said to have obtained about 65 per cent of the market.⁽²⁾

In 1964, more than 60 per cent of the polyvinyl chloride film and sheet imported into Canada originated in the U.S.A. Most imports of film and sheet are entered into Quebec and Ontario and the rest mainly into Western Canada, particularly British Columbia and Alberta.

Exports of vinyl film and sheet appear to be small and unimportant in the industry's operations.

Published prices of PVC film and sheet are not available. However, average value of shipments was about \$0.57 per pound and average value of imports, about \$0.50 per pound. It was indicated at the public hearing that prices range from about 25¢ per yard to \$1.25 according to thicknesses, widths, qualities and decoration.⁽³⁾

Other Products

Large amounts of PVC resin are used for the extrusion and moulding of a variety of articles such as wire coating, garden hose, profile shapes and panels, as well as a wide selection of toys and household articles. The flooring industry also is important and the prospects are for an increasing consumption of resin in the manufacture of tiles of new style. Other uses of PVC include the manufacture of flexible and rigid foam which in turn is used in flotation equipment, in the construction industry and as cushions in packaging and also in making specialized containers. There has been a growing field for vinyl covered folding doors for domestic and commercial application. Extruded rigid PVC pipe, corrosion resistant, is also being made increasingly available in normal and high-impact types, in diameter from 1/8 inch to 12 inches, with a complete range of fittings for piping systems in the construction of chemical plants. PVC uses also include the plastisol-coated materials such as textiles. Generally speaking PVC resins are being used in increasing amounts in virtually all of their present uses. However, the two major growth areas in the next few years appear to be in the building materials such as pipe, siding, corrugated panels and eaves troughing, and in blow-moulded bottles for detergents and similar household products.

The PVC fabricators in Canada, perhaps totalling around 40, vary from fairly large organizations including some of the resin manufacturers themselves to the small companies which in many cases are owner-managed. These companies, largely located in Ontario and Quebec,

(1) Transcript, Vol. 156, p. 23158

(2) Same, Vol. 154, p. 22819

(3) Same, Vol. 154, p. 22827

generally obtain their resins and compounds from domestic sources whenever grades and quantities are available. They are engaged in operations such as fabricating, coating, moulding, dipping, calendering and casting of materials such as tiles and flooring, window sections, pipes, tubes, sheet profiles, toys, hoses, wire covering, plastisol coating, footwear, gloves and other PVC products.

According to the pattern of consumption noted earlier, about 37 per cent of resin consumption in Canada in 1962 was for extruded or moulded products, including the use for the coating of wire and cable. The flooring industry was next in importance with about 28 per cent of the resin consumption. The flooring industry is considered to be a major factor influencing the substantial growth in domestic PVC consumption; production of vinyl-asbestos tile in 1964 was almost triple that of 1959. The amount of resin used for these tiles varies considerably depending upon the type of tile.

Production and Shipments of Vinyl-Asbestos Tile, 1959-65

	<u>Production</u> '000 sq.ft.	<u>Shipments</u>	
		'000 sq.ft.	\$'000
1959	58,131	54,071	10,719
1960	70,404	67,714	12,975
1961	91,001	90,189	15,015
1962	115,886	111,839	17,716
1963	141,232	130,289	20,761
1964	163,576	160,379	..
1965	184,517	170,990	..

Source: D.B.S., Catalogue Nos. 36-205 and 47-001 (monthly)

The value of shipments, therefore, doubled, from \$10.7 million in 1959 to \$20.8 million in 1963 and undoubtedly has increased further since that time.

Imports of vinyl-asbestos tile are apparently about 2 or 3 per cent of the Canadian market; they come principally from the United Kingdom, but also from Continental Europe, U.S.A. and Japan. Imports from the U.S.A. were said to be relatively small because the Canadian demand for vinyl-asbestos tile is concentrated in different thickness from that in the U.S.A.⁽¹⁾

Imports of Vinyl-Asbestos Floor and Wall Tiles, 1961-63

	<u>'000 sq.ft.</u>	<u>\$'000</u>	<u>\$/sq.ft.</u>
1961	5,254	884	.17
1962	4,446	726	.16
1963	4,592	725	.16

Source: D.B.S., Trade of Canada, Imports

(1) Transcript, Vol. 156, p. 23128

PVC Foam

PVC foam is most commonly produced by a mechanical process whereby an inert gas is mixed directly with plastisol under pressure. PVC foams are generally available as open cell and closed cell. The open cell type is used in cushions for furniture and foot pads. Closed cell type is used for flotation purposes, such as buoys, throw rings and floats. Both these types are manufactured in Canada. H.F. Products at Verdun, Que., produces open cell and Monsanto Canada Ltd. at Woodbridge, Ont., produces closed cell.

The Canadian market for PVC foam appears to be relatively small and specialized; for production to exist, it was said to be necessary for the Canadian manufacturers to supply the entire market; competition comes largely from the U.S.A. (1)

Tariff Considerations

Polyvinyl chloride resin in its various forms is entered chiefly under the following items:

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most-Favoured- Nation Tariff</u>
901(a) Synthetic resins without admixture, including scrap or waste:		
6. Vinyl type, except vinylidene	5 p.c.	5 p.c.
(b) Synthetic resins in the form of aqueous emulsions, aqueous dispersions or aqueous solutions, without admixture:		
6. Vinyl type, except vinylidene	5 p.c.	5 p.c.
(c) Synthetic resins in organic solvents where the solvent is not more than 60 per cent by weight, without other admixture:		
5. Other type	10 p.c.	10 p.c.
901(d) Synthetic resins, in powder or granular form, containing an ingredient to prevent caking in shipment, not in excess of 3 per cent by weight but without further admixture:		
2. Other type	10 p.c.	10 p.c.

(1) Transcript, Vol. 153, p. 22686

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most-Favoured- Nation Tariff</u>
902 Synthetic resins, compounded with other materials, in any form, including scrap or waste, for moulding, casting, extruding, calendering, pressing, (moulding compositions or materials for processing into moulding compositions); synthetic resins compounded with other materials in the form of not fully cured preforms or not fully cured blanks for compression mouldings:		
(d) Vinyl type, except vinylidene	10 p.c.	10 p.c.
904 Synthetic resin compositions, n.o.p.	15 p.c.	15 p.c.
905 Synthetic resin plates, sheets, film, sheeting or strips, not less than 6 inches in width, n.o.p.; synthetic resin lay-flat tubing, not less than 6 inches in circumference, n.o.p.:-		
(d) Vinyl type, except vinylidene:		
1. Plain, uncoated, undecorated	15 p.c.	15 p.c.
2. Other	15 p.c.	20 p.c.
906 Synthetic resin plates, sheets, film, sheeting or strips, less than 6 inches in width, lay-flat tubing less than 6 inches in circumference, other tubing, blocks, bars, rods, non-textile monofilament; synthetic resin profile shapes produced in uniform cross-section and imported in lengths: not further manufactured than moulded, cast, calendered, extruded or pressed, n.o.p.:-		
(c) Vinyl type, except vinylidene	15 p.c.	15 p.c.
907 Foamed and expanded synthetic resins, in logs, sheets, blocks or boards, or in flakes, granules or powder	15 p.c.	20 p.c.

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most-Favoured- Nation Tariff</u>
907 Foamed and expanded synthetic resins, in logs, sheets, blocks or boards, or in flakes, granules or powder	15 p.c.	20 p.c.
908 Manufacture of synthetic resins including floor and wall tile containing synthetic resin, n.o.p.	15 p.c.	20 p.c.
916 Laminated moulded plastics products, n.o.p., having synthetic resins or cellulose plastics as the chief bonding (impregnating) agents	15 p.c.	15 p.c.
917 Reinforced or supported synthetic resin or cellulose plastics plates, sheets, sheeting, strips, tubing, blocks, bars, rods, in which is incorporated a layer of paper, fibre-board, or textile fabric or a core of fibres whether matted or otherwise arranged, n.o.p.:		
(b) Other	15 p.c.	15 p.c.

Tariff Proposals

In addition to the general submissions referred to in the introductory sections, eighteen submissions were made to the Board dealing specifically with polyvinyl chloride resins and other PVC products. The names of the companies together with the proposals are listed in Appendix 11.

With respect to resins all three of the Canadian producers recommended an increase in the rates of duty. B.F. Goodrich Canada Ltd. proposed that polyvinyl chloride resins in their various forms and polyvinyl compounds be classified as under B.T.N. heading 39.02 and that the rates be 15 p.c., B.P. and M.F.N.⁽¹⁾ If a rate of 20 p.c. is granted on the monomer, B.F. Goodrich would want 20 p.c. on the polymers. The company did not propose any rates for the products made from these resins and compounds.⁽²⁾

Monsanto Canada Ltd. also recommended that polyvinyl chloride and copolymer resins, compounds, film, sheeting and foam be classified according to B.T.N. heading 39.02 but requested rates of 20 p.c. with a specific minimum of 4¢ per lb. for both the B.P. and M.F.N. Tariffs.

(1) Transcript, Vol. 153, p. 22779

(2) Same, Vol. 153, p. 22781

The company also proposed duties of 25 p.c., B.P. and 30 p.c., M.F.N. for articles made from these resins and classified by B.T.N. heading 39.07.(1)

Shawinigan Chemicals Limited recommended rates of 25 p.c. with a 4¢ per lb. minimum M.F.N., except for film and sheeting when surface-worked; for the latter the recommendation was a rate of 30 p.c., M.F.N. The company's proposals related only to the M.F.N. Tariff and it made no direct recommendation for the B.P. rate except to note that there was at present no margin of preference and it might be inadvisable to establish one. If for purpose of government policy a margin of preference were to be established, the company proposed that the B.P. rates be not more than 5 per cent lower than the proposed M.F.N. rates. The company also proposed an M.F.N. rate of 30 p.c. for PVC articles classified by B.T.N. heading 39.07, and a B.P. rate of 25 p.c.; these were the heading rates reported by the Industry Committee.(2)

It should be noted that both Shawinigan and Monsanto, in requesting increases in rates of duty on resin under B.T.N. 39.02 include plain plates, sheets, strips, film and other shapes in the same category and therefore under the same rates. Decorated or surface-worked plates, sheets, film and other shapes were, on the other hand, provided for separately at higher rates than the plain material. The recommendations of Shawinigan and Monsanto were supported by Dow Chemical of Canada Limited. Dow further stated that the rates on the resins and film and sheeting should not be lower than the 15 p.c., B.P. and 20 p.c., M.F.N. rates which the company had recommended on vinyl chloride monomer.(3)

Among the companies that fabricate products from resins, five representations, in general, requested either the elimination of existing rates of duty on polyvinyl chloride materials or at least no increase in them. In addition to Canadian General-Tower Limited these included the following fabricators, users and traders of PVC resins and compounds.

Ontario Fabricators

Barringham Plastics Limited, Oakville
 Biltex Limited, Toronto
 Building Products Limited, Hamilton
 Canadian Extruders Limited, Weston
 Flintkote Company of Canada Limited, The, Toronto
 Furlong Plastics Limited, Toronto
 General Wire & Cable Company Limited, Cobourg
 Keiner & Company Limited, Toronto
 Lido Industries Products Limited, Toronto
 Midland Industries Limited, Midland
 Micro Plastics Division of Building Products Limited, Acton
 Reliable Toy Company Limited, Toronto
 Viceroy Manufacturing Company Limited, Toronto

(1) Transcript, Vol. 153, p. 22676

(2) Same, Vol. 151, p. 22404-5

(3) Same, Vol. 153, p. 22807

Quebec Fabricators

American Biltrite Rubber Company of Canada Limited, Sherbrooke
 Armstrong Cork (Canada) Limited, Montreal
 Bemis Associates of Canada Limited, Sherbrooke
 Building Products Limited, Montreal
 Concord Rubber Limited, Lachine
 Consumers Glove Company Limited, Montreal
 Daly & Morin Limited, Lachine
 Edmont Canada Limited, Cowansville
 Evertex Company Limited, Granby
 National Vintex Corporation, Condiac
 Plasticana Company Limited, Montreal
 Service Backing and Coating Corporation, Montreal⁽¹⁾

The Ontario and Quebec groups specifically proposed that rates of duty under items 901(a)6 and 902(d) be eliminated or, in any event, not increased and that item 921 be retained unchanged.⁽²⁾ Similarly, the Japanese PVC Association, Tokyo, Japan, proposed no change in the present rates of duty under item 901(a)6; Mitsui and Company (Canada) Limited, Toronto, Ont., proposed that rates of duty under items 901(a)6 and 902(d) be eliminated or remain unchanged.⁽³⁾

Canadian General-Tower Ltd. opposed the suggestion that the present step-by-step structure of rates, establishing differentials based upon the degree of manufacture, be replaced by common rates applicable to vinyl products regardless of the degree of manufacture. In regard to end-use items, the company recommended the continuation of items 833, which provides duty-free entry for methyl ethyl ketone for use exclusively as a solvent for polyvinyl chloride, and 921 which provides duty-free entry for materials, of a kind not made in Canada, when used in the manufacture of synthetic resins and other shapes. The company proposed that if rates of duty were increased on basic resins, rates be correspondingly increased on the products.

The company also proposed that item 917(b) be revised to confirm that it does not include "coated fabrics". On this subject, there was a joint submission by the members of the coated fabrics industry namely:

Allied Rubber Inc., Montreal, Que.
 Bemis Associates of Canada Ltd., Sherbrooke, Que.
 Canadian General-Tower Ltd., Galt, Ont.
 Canadian Industries Ltd., Montreal, Que.
 Shawinigan Chemicals Ltd., Montreal, Que.
 Daly & Morin Ltd., Montreal, Que.
 Dominion Rubber Co. Ltd., Kitchener, Ont.
 Granby Elastic & Textiles Ltd., Granby, Que.
 Monsanto Oakville, Ltd., Oakville, Ont.
 Service Backing & Coating Corp., Montreal, Que.
 Stedfast Rubber Co. (Canada) Ltd., Granby, Que.

These companies brought to the attention of the Board the

⁽¹⁾ Transcript, Vol. 154, p. 22875, 22883

⁽²⁾ Same, Vol. 154, p. 22891

⁽³⁾ Same, Vol. 157, p. 23366; Vol. 158, p. 23393

difficulties in interpreting item 917(b). The companies believe that the risk of misclassifying coated fabrics under this item could be eliminated by introducing the phrase "except of textile fabrics" or alternatively by adding the sentence:

"Products incorporating woven or non-woven fabrics are not dutiable under this item but are dutiable under the appropriate textile item." (1)

The Canadian Paint Varnish and Lacquer Association Incorporated proposed duty-free entry with end-use criteria for solution-type vinyl chloride copolymer resins, and suggested that the item carry a two year expiry date which would be renewable for additional two year periods in the event that this type of resin is still not made in Canada. The annual consumption of this type of resin by the paint industry was said to be of the order of \$400,000. (2)

Two companies, Dominion Oilcloth & Linoleum Company Limited and the Flintkote Company of Canada, expressed their concern over the proposed rates of duty on PVC resin and indicated that they would require 25 p.c., B.P. and 30 p.c., M.F.N. under heading 39.07, should the full increase of the rates of duty requested on PVC resins be granted. (3) If there were no change in the rates on the resins, such an increase would not be needed on the products. Dominion Oilcloth produces floor coverings, oilcloth, vinyl coated fabrics and adhesives and, like Flintkote, is a manufacturer of vinyl-asbestos and asphalt floor tiles.

Canadian Industries Limited, which manufactures vinyl film and sheet, recommended duty rates under the M.F.N. Tariff of 25 p.c. on plain polyvinyl chloride film and sheet and 30 p.c. on decorated material with no recommendation for B.P. rates. (4)

Fingerhut International Limited, a manufacturer of automobile seat covers from plastics sheeting and embossed vinyl sheeting, proposed that items 905(d)1 and 905(d)2 on polyvinyl film and sheeting be maintained unchanged. (5) PVC sheeting, purchased in excess of 500,000 yards from Canadian manufacturers, was said to represent approximately 50 per cent of the cost of the company's raw materials and to account for about 65 per cent of the cost of manufacturing automobile seat covers. (6)

General Wire and Cable Company Limited, which took part in the Ontario Fabricators' submission, also made a separate submission to the Board in which it proposed free entry for the resins under item 901a; 17½ p.c., B.P. and M.F.N. for the compounds under item 902(d) and 30 p.c., B.P. and M.F.N. for the decorated and worked sheets, film, etc. under B.T.N. 39.02. (7)

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- (1) Transcript, Vol. 157, p. 23336
 - (2) Same, Vol. 158, p. 23396
 - (3) Same, Vol. 156, p. 23097, 23151
 - (4) Same, Vol. 154, p. 22824
 - (5) Same, Vol. 157, p. 23302
 - (6) Same, Vol. 157, p. 23303-4
 - (7) Same, Vol. 155, p. 22972

Minnesota Mining and Manufacturing of Canada Limited made a general submission to the Board in respect of products classified under B.T.N. headings 39.01 to 39.07 inclusive; the brief is dealt with in the introductory section. It should be noted here, however, that the company made special reference to unplasticized polyvinyl chloride film and to polyvinyl chloride film coated with adhesive which is known as "SCOTCHCAL", and requested duty-free entry for these products until they are made in Canada, at which time the rates would become 15 p.c., B.P. and 20 p.c., M.F.N.⁽¹⁾ Later, in a letter addressed to the Board, the company clarified its proposal by stating that the relevant type of unplasticized film was plain and of a thickness not exceeding .003 inch which is used in the manufacture of commercial emblems, traffic signs and other markings. Film of .005 inch and thicker was said to be made in Canada by Shawinigan Chemicals.⁽²⁾

Johnson & Johnson Limited from Montreal, Quebec, objected to duty-free entry on adhesive coated polyvinyl chloride film because the company was engaged in coating PVC film with an adhesive mass which is then sold as an adhesive bandage.⁽³⁾ The company suggested that rates on adhesive coated film should not be lower than those on the base film.

Paisley Products of Canada Limited, a wholesaler of building products, proposed 10 p.c., B.P. and 10 p.c., M.F.N. but not less than 2¢/lb., both B.P. and M.F.N., for polyvinyl chloride types under B.T.N. heading 39.02, except in the decorated or surface-worked forms for which the company proposed 15 p.c., B.P. and M.F.N.⁽⁴⁾

Stor-Aid of Canada Limited, a fabricator of articles from plastic sheeting, including garment bags and automobile accessories, proposed that items 905(d)1 and 905(d)2 be amended in the following manner:

- (d) vinyl type, except vinylidene:
 1. Plain, uncoated, undecorated and embossed
 2. Printed, coated, decorated, and all other

and that the rates of duty of these items, as amended, be maintained unchanged.⁽⁵⁾ In effect, the proposal would mean that embossed vinyl-type plates, sheets, film etc. would be included under tariff item 905(d)1 at rates of 15 p.c., B.P. and M.F.N., rather than at 15 p.c., B.P. and 20 p.c., M.F.N. under item 905(d)2. The company claimed that a higher M.F.N. rate on embossed film was no longer appropriate because advances in technology permitted embossing to be done during the process of manufacturing plain film, by the simple addition of an extra roller.⁽⁶⁾ This view was disputed by Canadian General-Tower, one of the film producers.⁽⁷⁾

(1) Transcript, Vol. 162, p. 24087

(2) Letter dated May 21st, 1964

(3) Transcript, Vol. 162, p. 24103

(4) Same, Vol. 123, p. 18489

(5) Same, Vol. 157, p. 23309

(6) Same, Vol. 157, p. 23307

(7) Same, Vol. 157, p. 23324

The Rubber Association of Canada included polyvinyl chloride in the list of materials used by its members for which it proposed that there be no change in the present tariff treatment.(1)

The Canadian Pulp and Paper Association likewise opposed any increase in rates of duty on materials used by its members, including specifically polyvinyl chloride.(2)

Arguments in Support of Tariff Proposals

The three manufacturers of polyvinyl chloride resin, in support of the proposed rates of duty, took the general position that because of the relatively small market available to Canadian producers, resin plants in Canada are smaller than those in many foreign countries, and domestic producers are, therefore, faced with higher capital investment and fixed costs per unit of production than are foreign producers.(3) A world over-capacity of vinyl chloride type resin, it was said, had given rise to a steady drop in price in the last eleven years - from 38.9 cents per pound in 1954 to about 15.5 cents in 1965. The spokesman for Shawinigan Chemicals stated that sales of major resin grades at a price of about 16 cents per pound were unprofitable and that, even though the Canadian producers could normally supply all of the market except for a small proportion of specialty grades, approximately one-third of the Canadian market is lost to imports. The spokesman went on to say:

"The market is growing steadily and the logical move is to increase facilities to take care of it. However, the prices are so depressed, because the duties are so inadequate, that Canadian producers are hesitant to invest more money in what has become a low margin operation. Yet, if they do not expand, they will be condemned to present costs and their present investment will be in jeopardy. An adequate tariff would enable them to expand in step with the market with some better assurance of a return on their money, as they would have a better opportunity to displace imports and obtain the Canadian market. Expansion would help reduce costs and enable the producers to stay in business."(4)

It was also pointed out that when the Tariff Board dealt with Reference No. 109, in the early 1950's, there was a world shortage of vinyl resins with high prices in relation to costs of production so that, even if imports took a sizeable share of the market, Canadian producers could at least export the displaced resin and recover some of the disability caused by imports. However, the situation since then was said to have changed markedly with the development of over-capacity and intense competition in world markets. Low-priced imports from Japan and Italy were having a depressing effect upon domestic resin prices while the U.S.A., with a serious over-capacity problem, continued its role as the principal competition to Canadian producers. Therefore, the specific rate minimum of 4¢ per pound was said to be

(1) Transcript, Vol. 123, p. 18394, 18404

(2) Same, Vol. 129, p. 19359

(3) Same, Vol. 153, p. 22686

(4) Same, Vol. 151, p. 22402

necessary to compensate for Canadian resin producers cost disability compared to larger foreign producers and the consequent downward pressure on prices caused by imports. It was further added:

"The 25% duty will provide more additional protection in cents per pound of product than the cost of a pound of film, floor tile, garden hose, etc., would be raised even if the four cents per pound duty on resin were taken full advantage of...The effect of the proposed duty of 25% but not less than four cents per pound on plain film and 30% on decorated film, should not only allay the fears of film producers on the possible impact of the increase needed on resin, it would also divert more of the imports of film to the Canadian film producers thus benefitting Canadian production of film and, as a corollary, of resin by increasing Canadian demand for resin." (1)

The resins manufacturers' proposals were opposed by most of the film and sheet producers and fabricators who use polyvinyl chloride resin as a basic material. The fabricators and users of Ontario and Quebec, Canadian General-Tower Ltd. and other consumers, expressed the view that increased tariff protection for the domestic resin would increase prices and thus raise even more the cost of their raw materials compared to that in other countries. (2) The spokesman for a group of fabricators and users of PVC resins in Quebec said that in the early 1950's the use of PVC was limited by the cost factor but as prices decreased due to an improvement in volume and processes, both resin producers and users had benefitted from the replacement of conventional materials with cheaper PVC products. It was also pointed out however that the prices for domestically produced PVC resins were among the highest in the world around 1962. For example, suspension type homopolymer vinyl resins were said to be offered on the Canadian market from domestic sources at 17¢ per pound, whereas the European and U.S. prices for a similar product were about 13 to 16¢ per pound. Emulsion type resins from domestic sources in truckload quantities were reported to be available at 24¢ per pound and the European prices for the same resin were apparently quoted at 15 to 16¢ per pound. It was also claimed that, in a substantial number of cases, only imported resins could meet the specifications for special uses required by the fabricators. The fabricators pointed out that the Canadian producers of PVC resin are themselves, through vertical integration, producers of substantial amounts of vinyl film, sheeting, coated fabrics and various types of extruded products and thus compete against the fabricators with the advantage of having control over the production of raw materials. While the present tariff situation appears to have given the fabricators enough margin to retain their independence they expressed concern that the proposed changes in rates of duty would remove their ability to compete.

The fear of an increase in the price of basic resins following an increment of the present duty rates was also manifest in the submission of Canadian General-Tower Ltd., which noted:

(1) Transcript, Vol. 151, p. 22413-4

(2) Same, Vol. 154, p. 22878

"If the present proposals of the chemical industry for an increase by more than five times the existing protection for basic resin is adopted, an independent producer of vinyl film and sheeting could be placed in an untenable position in relation to the two competitive manufacturers of film and sheeting who also manufacture basic resin and plasticizer... if these requests were granted, the integrated companies could increase their price of basic resins but not their prices of film and sheeting... Only the presence of effective import competition at the primary resin level can prevent this type of squeeze and price manipulation... Although basic resin producers have been subjected to the pressure of foreign competition, they have been able to maintain their place in the Canadian market and indeed have expanded their facilities." (1)

With reference to its recommendations concerning PVC film and sheet Shawinigan Chemicals stress that the domestic producers, as compared with their major competitors in other countries, have the familiar Canadian market problems such as generally smaller runs, higher unit selling expenses because of the smaller volume of sales per call, and a high incidence of small customers requiring only a few thousand pounds a month of assorted colours, widths and thicknesses. (2) It also claimed that the printing and embossing of film and sheeting in Canada is beset with problems similar to those in the styled textiles field in that customers prefer exclusive patterns and that printing costs, in which the cost of printing rollers is large, must be distributed over a smaller volume of production. The company expressed the view that:

"In Reference 109, the Tariff Board recognized the special problems on decorating over and beyond those on making plain film and recommended the maximum rate of duty it felt it was authorized to propose at the time. The Board had considered itself limited to the highest rate bound by GATT. In Reference No. 120, the Board is fortunately not bound by such a restriction." (3)

To a large extent Monsanto Canada Ltd. stated similar views to those of Shawinigan Chemicals and gave particular emphasis to the problem facing local producers of film and sheet who are expected to supply ranges of style and pattern comparable to those produced in the U.S.A. in a considerably smaller market. (4) The other resin producer, B.F. Goodrich, made no proposals for the products manufactured from PVC resins.

The spokesman for Canadian Industries Limited, also a manufacturer of film and sheet, said that:

"If domestic prices for these materials were to increase to take advantage of the proposed duty rates, selling price increases on vinyl film and sheet would be essential. The increased duty rates proposed by C.I.L. for vinyl film and sheet would permit price increases just large enough to

(1) Transcript, Vol. 156, p. 23164

(2) Same, Vol. 151, p. 22414

(3) Same, Vol. 151, p. 22416

(4) Same, Vol. 153, p. 22686

overcome the effect of increased costs and would merely retain the industry's present competitive position opposite imports of these products."⁽¹⁾

The fabricators and users of PVC resins, in contrast to C.I.L. and the integrated resin producers, generally expressed a strong preference for retention of the present rates of duty on film and sheet, as well as the present rates on resin. Similarly, those companies which use film and sheet, such as Fingerhut International Ltd. and Stor-Aid of Canada, Ltd., endorsed the view that present rates of duty on film and sheet, plain and decorated, should remain unchanged. Fingerhut International indicated that at present there was only one Canadian manufacturer of the particular type of clear sheeting which the company uses and that the control of the price of this material is subject only to competition from imports.⁽²⁾

The Japanese PVC Association and Mitsui and Company (Canada) Limited took the view that any increase in duty on PVC resins would result in increased costs for PVC finished products, thereby hindering the development of PVC products and an increase in the cost of these products to the consumer. Mitsui also drew attention to the "tremendous trade imbalance" existing between Canada and Japan as a reason for not increasing duties on resin imported from Japan.⁽³⁾

Analysis of Proposals and Arguments

The PVC industry in Canada began with the entry of Shawinigan Chemicals into resin production during World War II, Shawinigan was joined in 1950 by Monsanto and in 1956 by Goodrich, the latter having established itself initially in the market as an importer of PVC resins from its parent company in the U.S.A. The addition of these companies to the industry brought increased competition to a market already considered small in relation to those in other producing countries. The size of the market was, in turn, an important factor in limiting the size of Canadian plants which has meant that overhead costs have had to be distributed over a relatively small volume of production. It should be noted, however, that the size of the market did not deter B.F. Goodrich from establishing a plant in Canada rather than continuing to import resins under the present level of rates, nor has it prevented a considerable expansion of capacity in recent years. Moreover, at least one more company apparently intends to begin production on a large scale.

At the hearing there was a sharp division between the resin producers which recommended rate increases on PVC and the users of the material which requested that tariffs on resins remain unchanged or be removed entirely. In putting their proposals for substantial increases in rates on PVC resins to the Board, the producers contended that such increases were necessary to protect the Canadian industry from the effects of world over-capacity and declining prices, coupled with the disadvantages of scale consequent upon the relatively small Canadian market. The assertion was made to the Board that, notwithstanding the fact that

⁽¹⁾ Transcript, Vol. 154, p. 22817

⁽²⁾ Same, Vol. 157, p. 23303

⁽³⁾ Same, Vol. 157, p. 23367; Vol. 158, p. 23393(a)

Canadian consumption of PVC had outstripped domestic capacity, the existing level of tariff protection made Canadian resin producers reluctant to expand their productive facilities. The consumers of PVC resins, on the other hand, maintained that the resin producers were simply looking for additional protection in order to eliminate any risk involved in expanding their plant capacities to take care of the increased domestic demand. Low tariffs which would ensure resin supplies at prices in line with world prices were, in their view, essential to the maintenance of a healthy processing and fabricating industry in Canada.

Developments in the PVC industry since the public hearings in 1963 do not at present support the fears expressed by the resin producers that their future, without substantially increased protection, was in jeopardy. The present market situation, both domestic and international, is one in which demand has moved sharply upwards, prices have tended to strengthen somewhat and undercapacity, rather than overcapacity, has emerged for the time being. Established producers in Canada are expanding their plant capacities, after a period of operating at full capacity, and new large-scale producers are entering the field. The following comment from a trade publication seems to be supported by the investment activity in the PVC industry.

"There's no doubt now that 1964 will be remembered as the year that polyvinyl chloride, sparked by widespread technical and marketing developments, was launched into a boom period that won't run down until the late '60's or early '70's."(1)

Although imports of PVC resins in recent years amounted to a fairly large portion of the domestic market, a substantial part of them appears to have been necessary to supply the unprecedented expansion in PVC demand.

In addition to the issue of rates on resins, there is the question of the appropriate relationship of these duties to the tariffs on forms processed beyond the basic resin state. The present tariff provides a step by step increase in duties based on the degree of manufacture, proceeding from basic resins, to compounds, to plain film and sheet and so on up through other forms and fabricated products. The PVC resin manufacturers, in line with the general approach taken by the Industry Committee, requested that PVC in all forms up to, but not including, the fabricated stage be classified under B.T.N. heading 39.02. Basically, as Shawinigan Chemicals pointed out, the scope of heading 39.02, in respect to polyvinyl chloride, would comprise two groups of forms and products. The first group would include a variety of forms of PVC which now enter at various rates of duty under different items such as:

(1) Canadian Chemical Processing, July 1964, p. 53

	Present <u>Items</u>
resin without admixture	901(a)6
resin emulsions	901(b)6
resins in solutions	901(c)5
compounds	902(d) and 904
plain film and sheeting	905(d)1 and 906(c)
profile shapes	906(c)
foam	907
floor tile	908

Aside from floor tile, the manufacturers of polyvinyl chloride type resins now under item 908, such as raincoats, nursery items, draperies and garden hose, would be classified under heading 39.07. In this respect the B.T.N. Explanatory Notes provide that plates, sheets, and other materials, whether or not surface-worked, (including rectangles cut therefrom), with ground edges, drilled, milled, hemmed, framed, or otherwise worked or cut into shapes other than rectangular shape are classified as articles in heading 39.07.

The second group would include plates, sheets, strips, film, sheeting, foil and lay-flat tubing, (but not floor covering) when laminated, printed, embossed, decorated or otherwise surface-worked, which constitutes, in the main, the "decorated film and sheeting" of item 905(d)2. There is, therefore, included in the first sub-division a number of PVC products in different stages of manufacture and when the producers related their rate proposals to this type of classification they, in effect, replaced the step by step rate structure covering four or five stages of manufacture by only two or three stages.

The rates recommended by two of the producers would apply uniformly to all forms of the PVC resins classified in heading 39.02; one (Shawinigan Chemicals) proposed higher rates on the surface-worked film and sheeting than on the resins and plain film and sheet. With respect to products made from PVC resins and classified in heading 39.07, one producer (B.F. Goodrich) made no proposal concerning rates of duty, another (Monsanto) proposed an increase in the ad valorem rates from those proposed under heading 39.02; this brought its proposed rates on products up to the level of those proposed by Shawinigan Chemicals (25 p.c., B.P., 30 p.c., M.F.N.). It might be noted that the Shawinigan's proposed M.F.N. rate on products was the same as its proposed rate for surface-worked film and sheeting of heading 39.02; the company, however, made no proposal for a particular B.P. rate for film and sheeting under heading 39.02.

Such a system of classification would seem to put the integrated producer in a stronger market position compared with his un-integrated competitor, particularly if the rate of duty on the basic material were fairly high. The unintegrated processors and fabricators, while they did not object to the Brussels classification per se, were anxious that the present progressive structure of rates be maintained principally because it gives them freer access to imported materials, thus reducing their dependence on supplies of materials from integrated resin producers who are also their competitors. A

progressive structure of rates can, of course, be applied under the B.T.N. classification; the unintegrated processors of resins urged that it is as appropriate for the industry today as it was when the Board reviewed the industry in 1951.

No information was submitted to the Board by the basic resin producers to show specifically the extent to which the existing structure of rates or the present volume of imports created particular difficulties which would be overcome by the proposed rates. Nor was information submitted by the fabricators to show why the existing progressive rate structure was appropriate or necessary, beyond the explanation for the proposed maintenance of the present rates of duty on resin. The progressively higher rates of duty at various stages of processing undoubtedly yield different degrees of effective protection on the amount of processing actually performed by various fabricators; because of the relatively large element of cost of materials, the effective protection is generally much higher beyond the basic resin stage than the nominal rates indicate.

On the other hand, little information was presented before the Board to indicate why the present complex tariff structure was necessary; vinyl-type resins in organic solvents and resins compounded with other materials are dutiable at rates somewhat higher than those for the basic resins; emulsions are dutiable at the same rates as the resin; sheets, film and certain other shapes, in wider dimension, are dutiable at 15 p.c., B.P. and M.F.N. when plain or undecorated and at 15 p.c., B.P. and 20 p.c., M.F.N., when decorated, and the narrower film dutiable at rates of 15 p.c., B.P., 15 p.c., M.F.N.; foamed and expanded resins, moreover, bear rates of 15 p.c., B.P., 20 p.c., M.F.N., as do many of the products manufactured from the resins. This structure resulted from the Board's recommendations of more than a decade ago when the industry was far less developed than it is at present. The companies that appeared before the Board in 1963 did not favour complete uniformity of rates, as was frequently done by companies in other segments of the chemical industry, nor did the companies entirely agree on the number of stages of progression that were required. In the main, the submissions either gave general support for the existing structure, or favoured what was essentially a two stage structure in which higher rates would apply to forms and surface finishes beyond basic shapes and plain surfaces.

Summary of Rate Proposals on Polyvinyl Chloride

<u>Rates proposed by:</u>	<u>B.P.</u>	<u>M.F.N.</u>
1. Canadian Industries Limited		
Polyvinyl chloride film and sheet, plain material	no recommendation	25 p.c.
Polyvinyl chloride film and sheet, decorated material	no recommendation	30 p.c.
2. Canadian General-Tower Limited		
The company was interested in tariff items 833, 901(a)6, 901(b)6, 902(d),		

Rates proposed by: (Cont'd)

B.P.

M.F.N.

903, 905(d), 905(e), 906(c), 908,
909(a)3, 909(a)5, 917(b) and 921.

It proposed that the present wording and rates of these items be retained with the exception of item 917(b). The company proposed that the item 917(b) be revised by adding the words "not including coated fabrics" after the word "other".

3. Canadian Paint Varnish and Lacquer Association proposed that end-use criteria be applied to solution-type vinyl chloride copolymer resins and that the item be shown as follows:

Solution type vinyl chloride copolymer resins, in powder or granular form, when for use exclusively in the manufacture of the products described in B.N. 32.09

Free

Free

4. Dominion Oilcloth & Linoleum Company Limited. At the duty levels proposed for PVC resin, the company - they said - would need for their finished products the rates which have been put forward for heading 39.07, namely, 25 p.c., B.P. and 30 p.c., M.F.N.

5. Fabricators and Users of PVC Resins and Compounds in the Province of Quebec, namely:

American Biltrite Rubber Company
of Canada Limited
Armstrong Cork (Canada) Limited
Bemis Associates of Canada Limited
Building Products Limited
Concord Rubber Limited
Consumer Glove Company Limited
Daly & Morin Limited
Edmont Canada Limited
Evertex Company Limited
National Vintex Corporation
Plasticana Company Limited
Service Backing and Coating Corporation

Recommended that the rates of 5 p.c., B.P. and 5 p.c., M.F.N. under tariff item 901(a)6 be removed or remain the same, and that the rates of Free, B.P. and Free, M.F.N. under 921 remain unchanged.

Rates proposed by: (Cont'd)B.P.M.F.N.

6. Fabricators and Users of PVC Resins and Compounds in the Province of Ontario, namely:

Barringham Plastics Limited
 Biltex Limited
 Building Products Limited
 Canadian Extruders Limited
 The Flintkote Company of Canada Limited
 Furlong Plastics Limited
 General Wire & Cable Company Limited
 Keiner & Company Limited
 Lido Industries Products Limited
 Midland Industries Limited
 Micro Plastics Division of Building Products Limited
 Reliable Toy Company Limited
 Viceroy Manufacturing Company Limited

Recommended the elimination of the rates of 5 p.c., B.P. and 5 p.c., M.F.N. under 901(a)6, vinyl resin, and 10 p.c., B.P. and 10 p.c., M.F.N. under 902(d) vinyl compounds, or that they remain unchanged.

7. The Flintkote Company of Canada Limited
 Indicated that it would require 25 p.c., B.P. and 30 p.c., M.F.N. under heading 39.07, should the increase of the rates of duty requested on PVC resins be granted.

8. Fingerhut International Limited
 Proposed that item 905(d)1 and 905(d)2 on polyvinyl film and sheeting be maintained unchanged.

905(d)1	15 p.c.	15 p.c.
905(d)2	15 p.c.	20 p.c.

9. General Wire and Cable Company Limited

901a Resins	Free	Free
902d Compounds	17½ p.c.	17½ p.c.
39.02 - Decorated and worked sheets, film, etc.	30 p.c.	30 p.c.

10. B.F. Goodrich Canada Limited (Chemical Division)
 39.02(A) (Resins and compounds)

15 p.c.	15 p.c.
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11. The Japanese PVC Association
 Polyvinyl chloride resin

5 p.c.	5 p.c.
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Rates proposed by: (Cont'd)B.P.M.F.N.

12. Mitsui and Company (Canada) Limited
 Rates on polyvinyl chloride resin
 and compound, tariff items 901(a)6
 and 902(d) be eliminated or remain
 unchanged

13. Monsanto Canada Limited
 B.T.N. Heading 39.02

(1) Polyvinyl chloride type except
 plates, sheets, film, sheeting,
 foil and lay-flat tubing, when
 laminated, printed, embossed,
 decorated or otherwise
 surface worked
 but not less than

20 p.c.
 4¢/lb.

20 p.c.
 4¢/lb.

(2) Polyvinyl chloride type-plates,
 sheets, film sheeting, foil and
 lay-flat tubing, but not in-
 cluding floor covering, when
 laminated, printed, embossed,
 decorated or otherwise surface
 worked

25 p.c.

30 p.c.

14. Minnesota Mining and Manufacturing of
 Canada Limited
 Polyvinyl chloride film and polyvinyl
 chloride film coated with adhesive
 known as "SCOTCHCAL" at.....
 until these products are made in Canada,
 at that time the rates would become.....

Free

Free

15 p.c.

20 p.c.

15. Paisley Products of Canada Limited
 39.02

10 p.c.
 2¢/lb.

10 p.c.
 2¢/lb.

but not less than

39.02(A)

(1) Polyvinyl chloride type except
 in the forms described in 39.02C
 but not less than

10 p.c.
 2¢/lb.

10 p.c.
 2¢/lb.

(C) Plates, sheets, strip, film,
 sheeting, foil and lay-flat
 tubing, but not including floor
 covering; when laminated,
 printed embossed, decorated or
 otherwise surface worked.

15 p.c.

15 p.c.

16. Shawinigan Chemicals Limited
 39.02(A)

(1) Polyvinyl chloride type, except
 in the forms described in 39.02C
 but not less than

-
 -

25 p.c.
 4¢/lb.

39.02(C) plates, sheets, strip, film,
 sheeting, foil and lay-flat
 tubing, but not including floor

Rates proposed by: (Cont'd)B.P.M.F.N.

covering; when laminated, printed,
embossed, decorated or otherwise
surface worked.

-

30 p.c.

17. Stor-Aid of Canada Limited

Proposed that tariff items 905(d)1
and 2 be amended to read as
follows:

(d) Vinyl type, except vinylidene;

1. Plain, uncoated, undecorated and
embossed.

15 p.c.

15 p.c.

2. Printed, coated, decorated, and
all other and that the rates of
duty of these items, as so
amended, be maintained unchanged.

15 p.c.

20 p.c.

18. Rubber Association of Canada pro-
posed that there be no change in the
present Tariff treatment.

Polyvinyl Acetate

Polyvinyl acetate resin is a product of the polymerization of vinyl acetate monomer in the presence of a catalyst. The material is colourless, transparent and odourless with a high degree of resistance to water, oils and greases. It is available as a dry resin, in solution with a solvent such as acetone, ethyl acetate or benzene, and in the form of a water emulsion containing about 55 per cent polyvinyl acetate.

The dry resin is primarily used in the production of hot melt adhesives, solvent adhesives and lacquers, and as an intermediate in the manufacture of polyvinyl alcohol and polyvinyl acetals. The solution type polymers find application in the manufacture of adhesives and lacquers. The emulsions are used in latex type paints, coatings, adhesives, sealers, non-woven fabric binders, fabric finishes, paper coatings and as strengthening additives in cement.

Both dry resin and the emulsion are made in Canada; by far the greatest portion of polyvinyl acetate type resins are used in the form of aqueous emulsions.

The Industry

Shawinigan Chemicals, limited, the largest manufacturer of vinyl resins in Canada, began to produce polyvinyl acetate in both dry and emulsion forms before World War II. The company also makes its own vinyl acetate monomer and supplies the Canadian market requirements for this monomer as well as exporting it on a large scale.

A second producer, Polyresins Limited, began to manufacture polyvinyl acetate emulsion at Toronto in 1950 from monomer supplied by

Shawinigan Chemicals, Limited. Since then the rapid growth in the use of emulsion polymers in paints has stimulated the entrance of other firms, including a number of paint companies, to produce polyvinyl acetate emulsions. At present, there are some twelve manufacturers of PVA emulsions, concentrated mainly in the Toronto area.

<u>Company</u>	<u>Plant Location</u>	<u>Disposition</u>
Benjamin Moore Paints	Toronto, Ontario	Own use
The Borden Chemical Company (Canada) Limited	Toronto, Ontario	Own use and sale
British American Paint Co., Ltd.	Vancouver, B.C.	Own use
Canadian Hoechst Limited	Varennnes, Quebec	Sale
General Paint Corporation of Canada Limited	Vancouver, B.C.	Own use
The Glidden Co. Limited	Toronto, Ontario	Own use
The Imperial Flo-Glaze Paints Limited	Toronto, Ontario	Own use
National Starch and Chemical Co. (Canada) Ltd.	Toronto, Ontario	Own use and sale
National Adhesives Canada Limited	Toronto, Ontario	Own use and sale
Polyresins Limited	Toronto, Ontario	Sale
Reichhold Chemicals (Canada) Limited	Toronto, Ontario	Own use and sale
	Port Moody, B.C.	Sale
Shawinigan Chemicals, Limited	Shawinigan, Que.	Sale

Source: Transcript, Vol. 135, p. 20138; Canadian Plastics, February, 1964, p. 72 and June, 1964, p. 11

Total Canadian capacity for polyvinyl acetate was estimated, at the time of the hearing, at about 20 million pounds per annum and for the monomer, vinyl acetate, capacity was reported as being about 60 million pounds in 1964.⁽²⁾ Precise estimates are difficult to make because the basic equipment for the manufacture of polyvinyl acetate, a reactor kettle, is often also used for the production of other types of emulsions, particularly polystyrene.

The Market

Polyvinyl acetate is sold principally in the form of emulsion. Estimates of the Canadian market in 1963 for the product vary from some 10 million pounds to 13 or 14 million pounds measured as total weight of emulsion.⁽³⁾ This quantity would indicate a resin content, on a solids basis, of approximately 7 million pounds per year. At the public hearing, it was said that over a long period of time the growth in

(1) Transcript, Vol. 135, p. 20144

(2) Oil, Paint & Drug Reporter, June 1, 1964, p. 35

(3) Transcript, Vol. 135, p. 20143; Canadian Plastics, February, 1964, p. 72; Canadian Chemical Processing, September, 1963, p. 69

the market has been in excess of 10 per cent per year. Polyvinyl acetate was said to be quite widely used for masonry paints and latex type indoor paints, although, unlike the situation in Europe, its growth has been inhibited in North America by competition from the butadiene-styrene type resins which have been available in large supply from the synthetic rubber plants built during the second World War. Acrylic emulsions have also provided considerable competition in the paint field.

An indication of the level of consumption of PVA emulsions in recent years and the principal uses is given in the following table:

Consumption of Polyvinyl Acetate Emulsions, 1961-64

	<u>For Paint</u>	<u>For Adhesives and Other Uses</u> thousand pounds (a)	<u>Total</u>
1961	1,300	7,200	8,500
1962	1,500	8,000	9,500
1963	1,700	8,800	10,500
1964	2,000	10,300	12,300

(a) Pounds, emulsion basis, total weight of solid and liquid content

Source: Canadian Plastics

The Board was informed that, although a number of companies produce polyvinyl acetate, Shawinigan Chemicals, Limited and Polyresins Limited have a major portion of the Canadian market.⁽¹⁾ According to Shawinigan Chemicals, all types of resin generally required in Canada are available from domestic production.

Canada's international trade in polyvinyl acetate emulsions is said to be limited, in part because the product has to be shipped in special containers to prevent deterioration by freezing. The spokesman for Shawinigan Chemicals stated that it is preferable to export the vinyl acetate monomer to avoid shipping the water which makes up the emulsion. It was reported that there were no Canadian exports of the emulsion and only very limited exports of the dry resins. However, notwithstanding such problems of export, it was also claimed that imports of PVA emulsion into Canada were "substantial", an estimated 2 million pounds, or 15 to 20 per cent of the market, principally from the U.S.A. with some also from Germany. No imports were noted from countries entitled to British preferential rates of duty.

Pricing Policy and Prices

Polyvinyl acetate emulsion is priced on a delivered basis, and prices reflect the type of emulsion and quantity of purchase. Published prices in Canada and the United States of America have been similar since 1959, ranging, for carload lots, from 16.5¢ to 18.75¢ per pound for a 55 per cent solids emulsion.

(1) Transcript, Vol. 135, p. 20140

Prices of Polyvinyl Acetate Emulsion (55% solids),
in Canada and the U.S.A., 1959-63

<u>Canada</u>			<u>U.S.A.</u>		
Tankcars, dlvd.	Drums, c.l. dlvd.		Tankcars & carloads dlvd.		
	\$Can./lb.			\$U.S./lb.	
1959	0.180	0.2000	0.180	-	0.2025
1960	0.180	0.2000	0.165	-	0.1875
1961	0.165	0.1875	0.165	-	0.1875
1962	0.165	0.1875	0.165	-	0.1875
1963	0.165	0.1875	0.165	-	0.1875
1964	0.150	0.1725	..		..
1965	0.150	0.1725	..		..

Source: Canadian Chemical Processing; Chemical & Engineering News

The Board was told that, as of March 1963, the price of polyvinyl acetate emulsion in tank cars delivered in Quebec and Ontario in quantities of about 3,000 gallons was 16.5¢ per pound, 55 per cent solids.⁽¹⁾ No information was given concerning prices of the other types of polyvinyl acetate.

Tariff Considerations

Polyvinyl acetate, as dry resin without admixture, is entered under item 901(a)6 at 5 p.c., B.P. and 5 p.c., M.F.N. The emulsions are dutiable under item 901(b)6 also at 5 p.c., B.P. and 5 p.c., M.F.N. The resin in organic solvent is dutiable under tariff item 901(c)5 at rates of 10 p.c., B.P. and M.F.N. Under this item the weight of the solvent cannot be more than 60 per cent of the total weight. Moulding compounds are dutiable under tariff item 902(d) at 10 p.c., B.P. and M.F.N., and compounds in the form of adhesives are entered under item 903 at rates of 15 p.c., B.P. and 17½ p.c., M.F.N., other compositions are dutiable under item 904 at rates of 15 p.c., B.P. and 15 p.c., M.F.N.

There were three submissions specifically on polyvinyl acetate resins of types which would be classified under the B.T.N. by heading 39.02. In the B.T.N., polyvinyl acetate solutions are classified under 39.02 if the weight of the solvent does not exceed 50 per cent of the weight of the solution; if the weight of the solvent exceeds 50 per cent, the product is classified with paints and varnishes under B.T.N. heading 32.09. Polyresins Limited, a division of the Bate Chemical Corporation Limited, a manufacturer of polyvinyl acetate emulsions, indicated that the present tariff of 5 p.c., B.P. and 5 p.c., M.F.N. for polyvinyl acetate was inadequate and recommended, under B.T.N. heading 39.02, polyvinyl acetate in emulsion form at 15 p.c., B.P. and 20 p.c., M.F.N.⁽²⁾ Reichhold Chemicals (Canada) Limited was in agreement with the rate proposal recorded by the Industry Committee,⁽³⁾

(1) Transcript, Vol. 135, p. 20145

(2) Same, Vol. 135, p. 20135

(3) Same, Vol. 126, p. 18860

which would make the various forms dutiable at 25 p.c., B.P. and 25 p.c., M.F.N. but not less than 4¢ per pound under both B.P. and M.F.N. Tariffs, under heading 39.02. Shawinigan Chemicals, Limited recommended that these resins carry rates no lower than 15 p.c., B.P. and 20 p.c., M.F.N. (1)

The proposal to increase the rates of duty to 15 per cent, B.P. and 20 per cent M.F.N. on polyvinyl acetate was supported by the spokesman for the paint industry in the following terms:

"There are paint companies which do make polyvinyl acetate emulsions for their own use. It is possible that others will enter the field...On behalf of these paint companies... I would therefore indicate that they are in agreement with the rates of duty requested for polyvinyl acetate emulsions, namely 15 per cent B.P., 20 per cent M.F.N." (2)

Other than the general briefs referred to in the introductory note, there were no submissions to the Board opposing the proposals to increase the rates of duty on polyvinyl acetate. The Canadian Pulp and Paper Association, in its general submission opposing increases in rates of duty on materials used by its members, mentioned specifically polyvinyl acetate; the Association noted it was used as a coating aid to improve the finish of some papers. (3)

In support of the producers' requests for increased duties it was claimed that the smaller market and shorter production runs which prevailed in Canada resulted in increased unit costs relative to foreign competitors. (4) The Board was informed that application of the 5 per cent tariff together with the 5 per cent surcharge that existed in 1962-63 had encouraged the use of Canadian resin but there were still a number of potential customers who do not have sufficient incentive, in terms of cost, to evaluate the Canadian-made product. Reference was also made to the problem of selling to subsidiaries of United States firms which use formulations supplied by their parent companies. Shawinigan Chemicals Limited stated that the entire market should be supplied by Canadian manufacturers and that any requirements for special grades could be met from domestic production.

It would appear that the producers of polyvinyl acetate in Canada are enjoying a steadily expanding demand for their product. No disadvantage was claimed by them on the cost of raw materials, and their product appears to be priced at about the level of U.S. prices; this level had at least not prevented expansion in recent years; the location of Canadian producers near the principal market areas in Canada accorded them some advantage in shipping the emulsion with its 45 per cent water content.

(1) Transcript, Vol. 135, p. 20208

(2) Same, Vol. 135, p. 20164

(3) Same, Vol. 129, p. 19360

(4) Same, Vol. 135, p. 20134

Polyvinyl Acetal ResinsPolyvinyl Butyral and Polyvinyl Formal

Polyvinyl acetals fall into three groups: polyvinyl butyral, polyvinyl formal and polyvinyl acetal, of which only the first two are commercially important in Canada. There is no monomer form, and the resins are produced by the condensation of an aldehyde with polyvinyl alcohol. They are used in coatings, paints, waterproofing fabrics and adhesives.

At the time of the hearing, it was stated that polyvinyl acetal resins were not manufactured in Canada and that Canadian requirements were met by imports, mostly from the U.S.A. In its submission on polyvinyl acetate Shawinigan Chemicals reported that the company produced "small quantities of certain specialty polyvinyl acetal resins." The company, however, did not raise this matter during the later discussion of polyvinyl acetals. The principal use made of polyvinyl butyral and polyvinyl formal resins in Canada is in the paint industry and the spokesman for the Canadian Paint Varnish and Lacquer Association Incorporated said that annual consumption by the paint manufacturers amounted to about \$75,000.⁽¹⁾ The price was indicated to be around \$1.00 per pound.⁽²⁾

In the U.S.A., polyvinyl butyral resin finds its major application in the manufacture of polyvinyl butyral sheetings, the material used as an interlayer in the production of safety glasses for the automotive industry. This sheeting is not made in Canada and the supplies are imported from the U.S.A. by Monsanto Canada Limited and Du Pont of Canada Limited. At the public hearing, it was stated that Duplate Canada Limited manufactures about 75 per cent of the safety glass used in the Canadian automotive industry, the rest being made by Ford Motor Company of Canada.

Imports of polyvinyl butyral in sheet form in 1964 amounted to more than one millions pounds valued at about \$1.7 million. This represented an increase of about 54 per cent over the value of imports in 1959.

Imports of Polyvinyl Butyral Sheet, 1959-63

	\$'000	'000 lb.
1959	1,107	..
1960	880	..
1961	1,003	..
1962	1,418	963
1963	1,524	1,024
1964	1,709	1,161

Source: D.B.S., Trade of Canada, Imports

(1) Transcript, Vol. 149, p. 22222

(2) Same, Vol. 90, p. 13695

Published prices for polyvinyl butyral sheet are not available. Some idea of the price is obtained from the average value of imports for 1963 and 1964, of about \$1.48 per pound.

Tariff Considerations

Polyvinyl butyral and polyvinyl formal resins without admixture are entered under tariff item 901(a)6 at rates of 5 per cent B.P. and 5 per cent M.F.N. Polyvinyl butyral sheeting may enter Canada duty-free under end-use tariff item 805 which provides for materials to be used as adhesives in cementing together glass sheets for use in the manufacture of safety glass. It is otherwise entered under tariff item 903, when used as an adhesive, and at rates of 15 p.c., B.P. and 17½ p.c., M.F.N.

Three parties, the Canadian Paint Varnish and Lacquer Association,⁽¹⁾ The Society of the Plastics Industries (Canada) Incorporated,⁽²⁾ and Schenectady Varnish Canada Limited⁽³⁾ made submissions to the Board on polyvinyl butyral and polyvinyl formal resins and proposed that these materials enter Canada duty-free until they are ruled as "made in Canada".

There were four submissions made to the Board on polyvinyl butyral sheeting. Duplate Canada Limited and the Ford Motor Company of Canada requested the retention of tariff item 805 with its current provision for duty-free entry. Duplate Canada Limited indicated in its submission that the continuance of free entry of polyvinyl butyral sheeting is necessary to the maintenance of minimum production costs and a competitive selling price.⁽⁴⁾ Ford Motor Company stated that polyvinyl butyral sheeting is the only suitable material now readily available for making windshields for which product international competition was said to be intense.⁽⁵⁾ The Society of the Plastics Industries (Canada) Limited, in its general submission, suggested free entry for polyvinyl butyral sheeting as part of a general reduction in tariffs on primary plastics powders, pastes, sheets, etc. The Society made reference to the need for lower material costs in order to protect the jobs of many Canadians.⁽⁶⁾

Shawinigan Chemicals, Limited in its submission agreed, in principle, with the recommended rates of duty on polyvinyl butyral sheeting. However, the company proposed that tariff item 805, as such, be eliminated and that this product be included duty-free while not made in Canada, under a classification like B.T.N. heading 39.02.⁽⁷⁾ It was said that such a move would eliminate an end-use item and would provide an appropriate classification for the product. The spokesman for the company requested that a clear description be given of the material and that if its production were undertaken in Canada it would,

(1) Transcript, Vol. 149, p. 22221

(2) Same, Vol. 124, p. 18500

(3) Same, Vol. 127, p. 18930

(4) Same, Vol. 90, p. 13683

(5) Same, Vol. 90, p. 13686

(6) Same, Vol. 124, p. 18511

(7) Same, Vol. 90, p. 13687

in line with the Industry Committee's general recommendation, revert to the rates of duty proposed for the heading. Under the B.T.N. classification, both the resins and sheets would be classified by heading 39.02.

Polyvinyl Alcohol

Polyvinyl alcohol is a tough, rubber-like material which is resistant to oils, gases and other water insoluble solvents. There is no monomer form of polyvinyl alcohol; it is manufactured by hydrolysis of polyvinyl acetate.

The major use made of polyvinyl alcohol in Canada appears to be in the manufacture of polyvinyl acetate emulsion where it functions as an emulsifying and dispersing agent and protective colloid. It may also be used in paper coating and sizing and as a water soluble film for packaging soaps, detergents and dyes. As a water soluble resin it has different applications than most other polyvinyls, and does not generally compete with them, (1)

Polyvinyl alcohol is not made in Canada and is imported from the U.S.A., Germany and Japan. Import statistics are not available, other than for a six months period in 1960, during which time imports were reported at about \$7,000. (2)

Prices of polyvinyl alcohol are not published either in Canada or the United States.

Tariff Considerations

Polyvinyl alcohol enters Canada under tariff item 901(a)6 at 5 per cent B.P. and 5 per cent M.F.N.

Two consumers of this product made representations to the Board. The Bate Chemical Corporation Ltd., which uses polyvinyl alcohol in the manufacture of polyvinyl acetate emulsions, indicated that over 95 per cent of the company's requirements are purchased from the U.S.A., and the remainder from Japan. The company recommended that the product be permitted duty-free entry until such time as it is manufactured in Canada. (3)

The Society of the Plastics Industries (Canada) Incorporated, in its general submission, made a specific recommendation that "polyvinyl alcohol type resins in lumps, powders, granules or flakes" be duty-free. (4)

The Canadian Pulp and Paper Association, in its general submission opposing increases in rates of duty on materials used by its members, mentioned specifically polyvinyl alcohol, used as an adhesive in laminating and coating. (5)

(1) Transcript, Vol. 135, p. 20168

(2) Dept. of Trade and Commerce, Spotlight on Chemicals

(3) Transcript, Vol. 135, p. 20166

(4) Same, Vol. 124, p. 18498

(5) Same, Vol. 129, p. 19360

Polyvinyl alcohol resins are classified by the B.T.N. under heading 39.02, and the Industry Committee's general proposal would provide similar classification for it in the Canadian Tariff with the heading rates of duty to apply when the product is deemed to be made in Canada.

Polyvinyl Pyrrolidone (PVP)

Polyvinyl pyrrolidone was listed in a submission by the Canadian Pharmaceutical Manufacturers Association as one of the more important chemicals used by its members. The Association proposed that an end-use provision be made for materials used by its members with rates of Free, B.P., 15 p.c., M.F.N., for those not made in Canada, and rates of 15 p.c., B.P., 20 p.c., M.F.N. for those made in Canada.⁽¹⁾

Polyvinylidene Chloride

Polyvinylidene chloride is an odourless, tasteless, non-toxic and non-flammable thermoplastic material which exhibits extremely low water-vapour transmission and exceptional oil, grease and chemical resistance. It is obtained by polymerizing vinylidene chloride monomer or by copolymerizing vinyl chloride and vinylidene chloride. The resins thus produced range from flexible, moderately soluble materials to hard, tough products with long-wearing qualities.

The first vinylidene chloride polymers were commercially introduced by Dow Chemical Company in 1940 in the U.S.A. and this company also developed the copolymer of about 85 per cent vinylidene chloride with 15 per cent vinyl chloride known as saran. Similar products are now available from other manufacturers but Dow Chemical is still the primary world supplier of polyvinylidene chloride resins from a single plant at Midland, Michigan.

Polyvinylidene chloride is widely used in the form of extruded and oriented monofilaments for making upholstery fabrics, draperies and weather-resistant screening. Rigid pipe and tubing are also made from the resin. As a film polyvinylidene chloride is used for a variety of heat-sealing packaging applications where its outstanding moisture and vapour barrier qualities are of importance.

In Canada, the principal application made of polyvinylidene chloride is as a film for the protection and display of food products such as meats, poultry and cheese. The ability of this film to shrink under certain conditions, thereby ensuring a very tight fit, has greatly augmented its usefulness as a packaging medium. Bags are made from polyvinylidene chloride tubing cut to length; after the product is placed in the bag the air is drawn, the package sealed with a metal clip and quickly passed through hot water to shrink the film tightly to the product. In other packaging applications the products are over-wrapped with sheets of flat film and heat-sealed without vacuum and then shrunk to fit. The material is also employed as a coating to increase the packaging utility of other, less expensive films such as polyethylene.

⁽¹⁾ Transcript, Vol. 87, p. 13310

Polyvinylidene chloride resins are not made in Canada and the Board was told that, because of the limited size of the market, "It is not practical to manufacture them in Canada in the foreseeable future."⁽¹⁾ Film, in tubing form, is manufactured by the Cryovac Division of W.R. Grace and Company of Canada Limited, a firm engaged in the manufacture of a number of plastic packaging materials, at its plant in Cooksville, Ontario. In addition to the operations of blending, extruding, coating, laminating and slitting for film manufacture, the company also converts the material into custom printed bags and casings for food packaging. W.R. Grace was reported to be the only manufacturer of this film in Canada which it produces under licence from Dow Chemical Company. This licence, however, does not extend to the manufacture of film in the flat sheet form and this material was not produced in Canada in 1963, although W.R. Grace expressed the hope that the company might be allowed to do so eventually.

The resins are imported into Canada by Dow Chemical of Canada, Limited which supplies W.R. Grace's requirements for film manufacture. This material is also imported under the trade name of saran for use in a variety of ways, including the production of monofilaments, which in turn are used to weave outdoor furniture awnings, car seat covers and other products.⁽²⁾ Statistics on the importation of polyvinylidene chloride resins are not published but it was estimated at the hearing in 1963 that imports would be close to two million pounds per year and that they had increased by about 10 per cent in total in three or four years. Two million pounds of the resin might have a value of about \$800,000.

Imports of film in tubing form do not appear to be a significant factor in the Canadian market. The film in sheet form is imported directly by W.R. Grace and also by Dow Chemical of Canada, Limited. In the U.S.A., both W.R. Grace and Dow Chemical manufacture tubing and sheet film. The spokesman for W.R. Grace indicated that a large portion of the sheet film is imported in 35 pound rolls and sold directly to meat packers; some is printed by W.R. Grace.

In addition to resin and film there are some small imports of polyvinylidene chloride casings for meat packaging purposes. In the four years 1959-1962, the value of these fluctuated between \$2,000 and \$10,000 annually and all entered from the United States. Their average value was about \$1.60 per pound in 1959 and about \$2.00 per pound in 1962.

Exports of various polyvinylidene chloride materials, it was said, are small and destined principally to Australia, U.S.A., Europe and some countries in South America.

Published prices are not available. However, it was indicated to the Board that polyvinylidene chloride resin sold in Canada at about 39 cents (U.S.) per pound and film, in the one mil. thickness, at about 6.6 cents per thousand square inches,⁽³⁾ or about \$1.05 per pound. The Board was also told that the packaging material "sells for at least twice that of polyethylene and higher than other plastic film

(1) Transcript, Vol. 136, p. 20258

(2) Same, Vol. 136, p. 20336

(3) Same, Vol. 136, p. 20294

products."⁽¹⁾ Notwithstanding this cost factor it appears that its qualities have maintained for it a place in the market in those specialized uses for which it is adapted.

Tariff Considerations

Polyvinylidene chloride in its different forms is generally entered under the following items:

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most-Favoured- Nation Tariff</u>
901(a) Synthetic resins without admixture, including scrap and waste:		
9. Other type	Free	Free
905 Synthetic resin plates, sheets, film, sheeting or strips, not less than 6 inches in width, n.o.p.; synthetic resin lay-flat tubing, not less than 6 inches in circumference, n.o.p.:-		
(e) Vinyl type, vinylidene:		
1. Plain, uncoated, undecorated	Free	Free
2. Other	Free	Free
906 Synthetic resin plates, sheets, film, sheeting or strips, less than 6 inches in width, lay-flat tubing less than 6 inches in circumference, other tubing, blocks, bars, rods, non-textile monofilament; synthetic resin profile shapes produced in uniform cross-section and imported in lengths: not further manufactured than moulded, cast, calendered, extruded or pressed, n.o.p.:-		
(d) Vinyl type, vinylidene	Free	Free
908 Manufactures of synthetic resin including floor and wall tile containing synthetic resin, n.o.p.	15 p.c	20 p.c

The one submission made to the Board dealing specifically with polyvinylidene chloride was by W.R. Grace and Company of Canada

⁽¹⁾ Transcript, Vol. 136, p. 20252

Limited (Cryovac Division). A general submission for duty-free entry of certain resins was made by the Tariff Sub-Committee of the Moulders and Extruders Division of the Plastics Industry (Canada) Incorporated which included polyvinylidene type resins. W.R. Grace, in a supplementary submission, proposed that the rates of duty on polyvinylidene chloride type resins in lumps, powders, granules or flakes remain unchanged, duty-free under the B.P. and M.F.N. Tariffs; it also proposed that polyvinylidene chloride film as lay-flat tubing of sheet, not surface-worked, in rolls of 10 pounds or more be free of duty under both Tariffs. If the weight of the rolls was less than 10 pounds, it would appear that the company might favour classification under an item similar to B.T.N. heading 39.02 at rates of duty of 25 p.c., B.P. and 25 p.c., M.F.N., but not less than 5¢ per pound for both B.P. and M.F.N. Tariffs, as suggested by the Industry Committee. The 10 pounds was said to be an arbitrary figure to indicate an industrial form of the material as opposed to retail.⁽¹⁾ Other types of polyvinylidene chloride such as emulsions were not included in W.R. Grace's proposals.

The company agreed with the basic concept of accepting the Brussels Nomenclature for chemical tariff classification and for achieving standardization of nomenclature and for the organization for such a complex series of substances.

The Tariff Sub-Committee of the Moulders and Extruders Division of the Society of the Plastics Industry also proposed free entry under the B.P. and M.F.N. Tariffs for polyvinylidene chloride resins in lumps, powders, granules or flakes.⁽²⁾

At a public hearing in March 1963, the spokesman for W.R. Grace said that because of their "unique and highly specialized properties"⁽³⁾ these resins do not compete with Canadian produced primary resins in function, price or quantity, and since it is not practical, because of the size of the market, to manufacture them in Canada the only effect of a duty would be to raise the costs of food packaging, or to lower standards. A contrary view suggesting a fairly wide area of competition with other films was expressed by Canadian Chemical Company Ltd.⁽⁴⁾

With reference to its proposals on film, W.R. Grace's general position was given in the following words:

"We are suggesting that as far as films are concerned, we propose no higher tariffs than the tariffs which are placed on the resins from which they are made. We are not greatly concerned at what level that it occurs as long as it is low. It may be 5 per cent. It may be 10 per cent. When it gets up to 15 or 20, we begin to become squeamish about it. When it goes to 25 and 30 per cent, we think it is totally unreasonable and unjustified in film or resin"⁽⁵⁾

(1) Transcript, Vol. 136, p. 20249

(2) Same, Vol. 124, p. 18512

(3) Same, Vol. 136, p. 20258

(4) Same, Vol. 136, p. 20320

(5) Same, Vol. 136, p. 20331

From the discussion which took place before the Board it was apparent that the company was confident that it could compete with imports of polyvinylidene lay-flat tubing without tariff protection. With regard to the often mentioned problem of relative cost disadvantage arising from the smaller size of Canadian plants, W.R. Grace indicated that, although the company's parent U.S. plants were twice the size of the Canadian operation, Canadian costs were not much higher. The company was, for example, able to sell surface-worked, lay-flat tubing and bags at "significantly lower" prices than the landed U.S. price for the same products. It was the company's view that "Most of the incidents that are of great concern to the Canadian market seem to be situations of over-supply and, perhaps, inadequate enforcement of existing anti-dumping provisions." (1)

Another reference to polyvinylidene chloride was made by the spokesman for Dow Chemical of Canada who requested that duty-free entry for the Saran type film be qualified with the statement "When not made in Canada" since there was always the possibility that the product would eventually be made domestically at which time the proposed heading rates would be appropriate. (2)

There were no submissions in opposition to the above tariff proposals on polyvinylidene chloride.

POLYACRYLIC AND POLYMETHACRYLIC DERIVATIVES

The acrylics comprise a family of thermoplastic resins produced by the polymerization of monomers obtained from acrylic, substituted acrylic and methacrylic acids and their derivatives. These monomers, products mainly of B.T.N. heading 29.14, were said to be not produced in Canada at the time of the hearing on the related headings. When used in the production of synthetic resins, the monomers, while not made in Canada, are admitted free of duty under tariff item 921 under both the B.P. and M.F.N. Tariffs.

These resins are strong, rigid, chemical- and weather-resistant materials with excellent electrical insulating properties. Their particular quality of high optical clarity has led to their widespread use for automobile parts such as tail-lights, aeroplane canopies and windows, T.V. shields, signs and displays, shower enclosures, industrial window glazing and similar applications. They also play an important role in the formulation of paints and in making adhesives and bindings. Acrylics are available in the form of resins without admixture, emulsions or latices, solutions, moulding powders and other compounds and also as rigid sheets, rods and tubes. The acrylics are here dealt with first in the basic forms of resins and then in the forms of sheet or film.

Basic Resins

The term basic resins is here intended to describe resins without admixture, whether dry, in aqueous emulsions or in solvents, as well as resins in the form of moulding or other compounds. Of these products only the acrylic emulsions or latices are produced commercially in Canada. Certain paint manufacturers produce acrylic

(1) Transcript, Vol. 136, p. 20255

(2) Same, Vol. 136, p. 20337

resins in organic solvents for their own use. Many of the available published statistics relate to these resins as a group, or exclude the latices.

Canadian consumption of acrylic powders for moulding and extrusion is supplied entirely by imports. The market in recent years is estimated as follows:

Imports of Acrylic Powders for Moulding and
Extrusion (net resin dry basis), 1956-64

	'000 lb.
1956	540
1957	600
1958	600
1959	600
1960	620
1961	680
1962	1,700
1963	3,000
1964	3,800

Source: Canadian Plastics, various issues

The same source indicated that imports and consumption of liquid acrylic resins (other than latices), probably resins in organic solvents, for use in the production of paints and polyester panels, amounted to 1,500,000 pounds in 1963 and to 2,000,000 pounds in 1964.

Official import statistics are available only since 1961 and the relevant statistical class covers all the forms of basic resins including latices. More than 95 per cent of the imports have been from the U.S.A., with small amounts coming from the United Kingdom, West Germany and Switzerland.

Imports of Acrylic Resins, 1962-64

	Canada			U.S.A.		
	'000 lb.	\$'000	\$/lb.	'000 lb.	\$'000	\$/lb.
1962	12,010	4,242	.35	11,599	4,055	.35
1963	13,534	5,087	.38	13,046	4,887	.37
1964	14,594	5,301	.36	13,990	5,074	.36

Source: D.B.S., Trade of Canada, Imports

There are also available U.S. statistics on exports to Canada of acrylic and methyl methacrylic resins, unfinished and semi-finished, excluding laminated film and sheet. For 1962, 1963 and 1964, these are considerably lower than the corresponding Canadian

import figures. These differences are accounted for, at least in part, by the fact that the Canadian import class covers acrylic resins for dental purposes and polyacrylamide resins, both of which are included in other classes in U.S. export statistics. The Canadian import data might also include some importations of acrylic monomers, though comparison of average values in the two sets of data would suggest that any such inclusion of monomers is not a large part of the total.

U.S. Exports to Canada of Acrylic and
Methyl Methacrylic Resins, 1959-64

	'000 lb.	\$'000	\$/lb.
1959	4,912	1,402	.29
1960	2,957	1,025	.35
1961	3,647	1,232	.34
1962	6,698	1,916	.29
1963	6,968	2,305	.33
1964	7,639	2,575	.34

Source: U.S. Department of Commerce, Bureau of the Census, FT410, Exports of Domestic and Foreign Merchandise, s.c. 82585

An important and increasing use of acrylic resins is in the paint and varnish industry. In recent years, the D.B.S. has published figures for the acrylic resins used by this industry; it is understood that these figures include those acrylic emulsions reported by firms in the industry, as synthetic resins and acrylics and exclude those reported as latex emulsions.

Consumption of Acrylic Resins by Paint
and Varnish Manufactures, 1956-63

	'000	\$'000	\$/lb.
1956	492	120	.24
1957	957	319	.33
1958	1,274	324	.25
1959	1,099	285	.26
1960	1,355	345	.25
1961	2,124	490	.23
1962	1,904	559	.29
1963	2,198	603	.27

Source: D.B.S., Cat. 46-210

Acrylic Emulsions

These are aqueous dispersions, approximately 50 per cent water by weight, of highly polymerized acrylic or methacrylic esters,

and are often referred to as acrylic latices; the terms "emulsions" and "latices" are used here interchangeably. Different monomers may be used depending upon the purposes for which the latex is to be used. There are also emulsions which are copolymers of acrylic and other monomers; those in which the acrylic or methacrylic monomer predominates are considered to be of the acrylic type. These emulsions are made by a batch process directly from the monomer without passing through the dry resin stage.

The largest user of acrylic latices in Canada is in the paint industry. They have been used principally in exterior paints, but the production of acrylic premium grade interior paints is increasing. Acrylic latices are also used in the paper industry as pigment binders for coated paper in glossy magazine stock, and in the textile and leather industries as binders. A further use for these resins is in the production of self-polishing waxes.

There are four commercial producers of these emulsions in Canada, all located in the Toronto area. These are Borden Chemical Company (Canada) Limited, Polyresins Limited, Reichhold Chemical (Canada) Limited and Rohm and Haas Company of Canada Limited. Rohm and Haas was said to be the leading supplier and to have sufficient capacity to supply the entire Canadian market.⁽¹⁾ It is understood that some Canadian paint companies make emulsions for their own use.

Production and consumption of acrylic emulsions has experienced a continuing growth in Canada and is expected to continue to do so. Some estimates of consumption in the paint and the paper industries, excluding captive production, are available.

Consumption of Latices of Acrylics for
Paint and Paper, 1959-64

	'000 lb.
1959	1,300
1960	1,300
1961	2,000
1962	2,200
1963	3,500
1964	4,400

Source: Canadian Plastics, various issues

At the public hearing, the spokesman for the four commercial producers suggested that, in 1962, imports held about 25 per cent of the wax market. He anticipated that in 1963 this share would drop to about 15 per cent, attributing this decline to more aggressive sales tactics on the part of the producers, and to change in ownership of one of the wax producers which had resulted in the substitution in formulations of Canadian for U.S. latices.⁽²⁾

⁽¹⁾ Transcript, Vol. 126, p. 18889

⁽²⁾ Same, Vol. 149, p. 22247

Acrylic Solutions

At the public hearing, it was stated that certain paint companies were producing acrylic resins in organic solvents for their own use. It was also suggested that one of the producers of acrylic emulsions was considering production in Canada of acrylic solutions.

Tariff Considerations

The basic acrylic resins are not provided for, by name, in the Canadian Customs Tariff. In its report on Reference 109, Resins and Plastics, in 1952, the Tariff Board found it unnecessary to make specific provision for acrylic resins, without admixture, or in aqueous emulsions or in organic solvents, or in the form of moulding or other compounds. These were allowed in the various provisions made for "other" resins. In the items for film and sheet, however, acrylic forms were specifically mentioned. It is understood that the acrylic resins are dutiable principally under the following items:

<u>Item</u>	<u>British Prefer- ential Tariff</u>	<u>Most Favoured- Nation Tariff</u>	<u>General Tariff</u>
901(a) Synthetic resins, without admixture, including scrap or waste:			
9. Other type	Free	Free	10 p.c.
(b) Synthetic resins in the form of aqueous emulsions, aqueous dispersions or aqueous solutions, without admixture:			
8. Other type	Free	Free	10 p.c.
(c) Synthetic resins in organic solvents where the solvent is not more than 60 p.c. by weight, without other admixture:			
5. Other type	10 p.c.	10 p.c.	20 p.c.
902 Synthetic resins, compounded with other materials, in any form, including scrap or waste, for moulding, casting, extruding, calendering, pressing, (moulding compositions or materials for processing into moulding compositions); synthetic resins compounded with other materials in the form of not fully cured preforms or not fully cured blanks for compression mouldings:			
(f) Other type	Free	Free	10 p.c.

<u>Item</u>	<u>British Prefer- ential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>	<u>General Tariff</u>
904 Synthetic resins compositions, n.o.p.	15 p.c.	15 p.c.	25 p.c.

Under the Brussels Tariff Nomenclature, all these basic acrylic resins would be classified under heading 39.02 with the exception of certain acrylic solutions. In the B.T.N., any solution in volatile organic solvents when the weight of the solvent exceeds 50 per cent of the weight of the solution would fall under heading 32.09 as acrylic lacquers. Hence, solutions containing more than 50 per cent but not more than 60 per cent of volatile organic solvents, now classified as synthetic resins under tariff item 901(c)5, would not be considered to be synthetic resins in the B.T.N. system. Certain acrylic solutions containing more than 60 per cent by weight of organic solvents are now classified under tariff item 904; these also would fall under B.T.N. heading 32.09.

With the exception of the acrylic emulsions, the basic acrylic resins were the subject only of general submissions. All these resins would be covered by the general proposals either for the application of heading rates without exception, or to retain the existing tariff items and rates.

The Rubber Association of Canada included acrylic resins in its list of products of interest to, and used by, its members.⁽¹⁾ In advocating no change in the existing rates, the Association claimed that the plastics industry was flourishing under the existing tariff, that Canadian duties should be kept low so that Canadian manufacturers of plastics and plastic products could keep abreast of technological advances in the U.S.A., and that any increase in the duties on plastics would inflict crippling cost increases on rubber manufacturers engaged in the production of plastics and plastic products, seriously restricting their further expansion into this field.

In its list of resins not produced in Canada for which free entry was requested, Minnesota Mining and Manufacturing Company of Canada Limited included:

Polyacrylate resins in lumps, powders, granules, flakes, liquid or pastes; and
Polyacrylamide resins in lumps, powders, granules, flakes, liquid or pastes.⁽²⁾

By letter to the Board, the company subsequently modified its proposal to cover:

⁽¹⁾ Transcript, Vol. 123, p. 18405

⁽²⁾ Same, Vol. 162, p. 24087

Polyacrylate resins in lump, powder, granule or flake form,
and
Polyacrylamide resins in lump, powder, granule, flake,
liquid or paste form.

The company further proposed that if any of these resins become made in Canada, they should then be dutiable at rates proposed by the company for heading 39.02, that is 15 p.c., B.P., 20 p.c., M.F.N. The company stated that it favoured free entry for raw materials and manufactured products not made in Canada which are of importance to the Canadian economy. This is to stimulate the growth of the Canadian market to the point where manufacture in Canada would be justified, at which time there should be protection equivalent to the prevailing rates on Canadian made materials.(1)

Du Pont of Canada Limited requested free entry, until made in Canada, for polydiethylamino ethyl methacrylate, an acrylic solution now imported under tariff item 901(c)5, used in the production of spandex fibre.(2) It was stated that this is the only use for the product in Canada. The company made no recommendation as to the rates which would be appropriate if the product should become made in Canada.

The Canadian Pulp and Paper Association, in listing the interests of its members as consumers of certain products within the terms of Reference 120, stated that it opposed any tariff revisions leading to increased rates on chemicals used by the pulp and paper industry.(3) The list included acrylic resins and acrylic copolymers used as binders in water-proofing coated papers for offset printing.(4)

Acrylic emulsions were the subject of a joint submission to the Board by the four Canadian producers mentioned previously and they were also discussed by Reichhold in another submission which embraced all of the company's products in the resin field. The producers indicated they did not require the heading rates reported by the Industry Committee, and that rates of 15 p.c., B.P., 20 p.c., M.F.N., would be adequate to ensure them the Canadian Market.(5)

The spokesman for the producers said that import competition was serious in those emulsions used in the production of self-polishing waxes. In this field, Canadian subsidiaries of U.S. producers were said to use formulations devised by their parent companies based on U.S. raw materials. The application of the proposed rates of duties would, it was suggested, compel them to consider substituting Canadian-made emulsions.

Producers in the United States were said to have locational advantages in some regions of Canada, as well as advantages of the lower costs arising from the production of larger batches in larger kettles. The application of a duty under the M.F.N. Tariff, against imports from the U.S.A., appeared to be the principal concern of the Canadian

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- (1) Transcript, Vol. 162, p. 24091-2
 - (2) Same, Vol. 174, p. 28556
 - (3) Same, Vol. 36, p. 5246
 - (4) Same, Vol. 129, p. 19359
 - (5) Same, Vol. 149, p. 22233, 22252

producers who said they must absorb substantial freight costs to serve a spread-out market. The actual locational advantage or disadvantage to Canadian producers was not analyzed. The producers also suggested that declining foreign prices would make the now duty-free Canadian market more attractive to and susceptible to competition from foreign producers. They reported that, while there had been offers of imports from overseas, there had been no sales of commercial significance. No exports were indicated.

In its general submission on resins, Reichhold pointed out that in many cases its raw materials are subject to higher rates of duties than apply to the finished product, and that the costs of raw materials could amount to from 70 per cent to 90 per cent of the manufacturing cost for these products. However, for acrylic emulsions, the monomer is admitted free of duty under tariff item 921 as long as it is of a kind not made in Canada; continued free entry was proposed for them until they are produced in Canada. Free entry for the monomers, combined with a 20 p.c. rate on the emulsions, would accord a very much higher effective rate on the value added in Canada.

Acrylic Film and Sheet

It was made clear to the Board at the time of the public hearing that the only forms of acrylic film or sheet then being produced in Canada were patterned, extruded polymethyl methacrylate sheets. Recently, however, production has started of cast polymethyl methacrylate sheets.

At a hearing in May 1963, there was a lengthy discussion of the different processes of producing polymethyl methacrylate sheets and of the appropriate wording to describe the different forms in which they are made.⁽¹⁾ Both cast and extruded sheets can have a plain, clear or coloured surface or a decorated surface and both can be produced with either flat, smooth surfaces, which will be referred to in this analysis as plane-surfaced sheets, or with raised or indented three-dimensional surfaces incorporating a prismatic or other design, which will be referred to here as patterned surface sheets. All forms can either be made in, or further processed into, profile shapes for use in lighting fixtures.

Cast sheets are produced from methyl methacrylate monomer in the form of a syrup which is polymerized in a mould consisting of two plates of tempered glass separated by the desired width of the sheet. After the syrup has been poured into the mould, it is held in place by a gasket; the entire assembly is then put into an oven, heated, subsequently cooled and then separated from the glass plates. The production of patterned sheet simply requires that the glass mould have on it the pattern desired in the final product.

Extruded sheet is produced from a methyl methacrylic solid polymer by a melt process through a die. If a pattern is desired, it is obtained by passing the sheet through an embossing roll in the process of manufacture.

⁽¹⁾ Transcript, Vol. 150, p. 22262-22355

Polymethyl methacrylate sheets, because of their unusual degree of resistance to the effects of exposure to sunlight, heat and weathering, are used for outdoor applications such as signs and displays, and for decorative panels, skylights and glazing. The optical properties, toughness and rigidity of the sheets make them uniquely suited for aircraft canopies and windshields, and the permanence of clarity, colour and impact resistance, together with ease of forming, make these sheets popular for interior applications. The possibility of producing sheets with prismatic designs makes them useful in forming lenses for lighting fixtures.

There was considerable variation in the opinions expressed by interested parties at the hearing as to the extent to which cast and extruded sheets are competitive. In a trade publication,⁽¹⁾ it is stated that differences in optical properties are slight and that chemical, di-electric, and weathering properties appear to be the same. Cast sheet is said to have higher strength and resistance to heat. Forming temperatures for cast sheet are as high as 360°F., while the limit for extruded sheet is 325°F. At forming temperatures, extruded sheets are softer and require more support; they also have a greater tendency to stick together if touched or folded. Cementing of extruded materials requires a less active or milder cement than cast sheets. At the hearing, it was suggested that thicker and wider sheets could be produced by casting than by extrusion.⁽²⁾

While there is little published statistical information, it was estimated at the hearing that the market in Canada in 1962 for cast acrylic sheet was over 4 million pounds, valued at more than 3 million dollars.⁽³⁾ The annual market for patterned extruded sheet was said to be about one-quarter million pounds, about half of which was supplied by imports from the U.S.A. At the time of the hearing, all the cast sheet was being imported, and supplied some 95 per cent of the market.⁽⁴⁾

Patterned extruded sheet is produced in Canada by Building Products of Canada Limited, Acton, Ont., and by G.M. Plastics Corporation, Granby, Quebec. In October 1964, production in Canada of cast acrylic sheets was begun at Morrisburg, Ontario, by Sea-Way Chemicals Limited, a wholly-owned subsidiary of Rohm & Haas Company of Canada, Limited. The representative of G.M. Plastics stated at the hearing that his company could produce extruded plane sheet, but that it was not economically feasible to do so. It has been reported that Building Products of Canada Limited is to produce extruded plane sheet, and that Canadian Industries Limited is constructing a plant at Nobel, Ont., to make cast and extruded acrylic sheet, including extruded plane sheet.⁽⁵⁾

Import statistics for acrylic film and sheet have been published by the D.B.S. since January 1, 1962, though the exact coverage of the relevant statistical class might extend somewhat beyond the coverage of two principal tariff items relating to acrylic film and sheet.

(1) Modern Plastics Encyclopaedia Issue for 1963, Hildieth Press Inc., Bristol, Conn., 1962, p. 555,560

(2) Transcript, Vol. 150, p. 22267, 22282

(3) Same, Vol. 150, p. 22291, 22301, 22304

(4) Same, Vol. 150, p. 22266

(5) Canadian Plastics, January 1966; Canadian Chemical Processing, December 1965

Imports of Acrylic Film and Sheet, 1962-64

		<u>All Countries</u>	<u>U.S.A.</u>	<u>U.K.</u>	<u>W. Germ.</u>	<u>Japan</u>
1962	'000 lb.	4,904	2,602	1,212	958	122
	\$'000	3,589	2,022	830	664	66
	\$/lb.	.73	.78	.68	.69	.54
1963	'000 lb.	4,376	2,135	1,059	731	433
	\$'000	3,116	1,629	725	510	237
	\$/lb.	.71	.76	.68	.70	.55
1964	'000 lb.	6,160	2,307	2,572	950	309
	\$'000	4,167	1,694	1,663	637	158
	\$/lb.	.68	.73	.65	.67	.51

Source: D.B.S., Trade of Canada, Imports

Small amounts of film and sheet have also been imported from Spain and Italy. There is no evidence of any Canadian exports.

The share of imports supplied by each of the major foreign suppliers can be seen from the following table:

per cent of total imports

	<u>by weight</u>			<u>by value</u>		
	<u>1962</u>	<u>1963</u>	<u>1964</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>
United States	53	49	37	56	52	41
United Kingdom	25	24	42	23	23	40
West Germany	20	17	15	19	16	15
Japan	2	10	5	2	8	4

Tariff Considerations

Acrylic sheets are classified principally under the following tariff items in the Customs Tariff

<u>Item</u>	<u>British Prefer- ential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>	<u>General Tariff</u>
905 Synthetic resin plates, sheets, film, sheeting or strips, not less than 6 inches in width, n.o.p.....			
(b) Acrylic type, not further manufactured than moulded or cast.....	Free	Free	10 p.c.

<u>Item</u>	<u>British Prefer- ential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>	<u>General Tariff</u>
906 Synthetic resin plates, sheets, film, sheeting or strips, less than 6 inches in width.....; synthetic resin profile shapes produced in uniform cross-section and imported in lengths: not further manufactured than moulded, cast, calendered, extruded or pressed, n.o.p.:- (b) Acrylic type	Free	Free	10 p.c.
908 Manufactures of synthetic resins...,n.o.p.....	15 p.c.	20 p.c.	30 p.c.
326f Moulded illuminating shades, reflectors and refractors of...synthetic resins,...of a class or kind not made in Canada, designed for use with lighting fixtures or with portable lamps	Free	15 p.c.	32½ p.c.
*445 Electric light fixtures and appliances, n.o.p., and complete parts thereof.....	20 p.c.	22½ p.c.	30 p.c.

* Item 445 is not part of Reference 120

Some difficulty is encountered in equating the scope of the above tariff items to the scope of B.T.N. heading 39.02. Generally speaking, however, it would appear that those acrylic sheets now classified under tariff items 905(b) and 906(b) would fall under heading 39.02; the others would likely be classified as manufactured products of heading 39.07, though some of the sheets dutiable under tariff item 908 might come under 39.02.

The Explanatory Notes to the B.T.N. state that heading 39.02 covers plates, sheets, strip, film and foil, whether or not containing fillers or colouring matter, and which may be printed or otherwise surface-worked (polished, embossed, coloured, etc.) or merely curved and/or corrugated, but not otherwise worked. They may also be cut into rectangles, even if, as a result of being cut, they become finished articles. The heading also applies to profile shapes, whether or not containing added fillers or colouring matter, including such products which have been merely cut to a length exceeding the maximum cross-sectional dimension, or surface-worked (polished, matt-finished, etc.) but not otherwise worked. Products further processed, i.e. drilled, milled, hemmed, framed, etc. or not otherwise meeting the above definitions, would be classified to heading 39.07 if not more specifically provided for elsewhere in the B.T.N.

At the public hearing, submissions were received representing three sources of supply of cast polymethyl methacrylate sheet. Rohm and Haas Company of Canada Limited, Toronto, Ont., spoke as an importer from Rohm & Haas Co., in the U.S.A. and there were written submissions, not orally supported, from I.F. Slessor & Company Limited, Toronto, as sole Canadian agents for Rohm & Haas GMBH, Darmstadt, Federal Republic of Germany and from Imperial Chemical Industries Limited, London, England. There was also incorporated into the record a submission from Tek Plastics, Limited, Rexdale, Ontario, a producer of signs made from cast polymethyl methacrylate sheets. After the hearing, the Board received a letter from Mitsubishi International Corporation, Vancouver B.C., enclosing a submission from Mitsubishi Rayon Company Limited, Tokyo, Japan.

A representative of G.M. Plastics Corporation, Granby, Quebec, presented a brief on behalf of his company which extrudes patterned sheets; he stated that the company could extrude plane-surfaced sheets if it were economically feasible to do so.

The representations concerning cast polymethyl methacrylate sheets were all predicated upon these not being produced in Canada. Rohm and Haas suggested free entry for "polymethyl methacrylate sheets, as cast, not further processed than shrunk, trimmed or brushed", under heading 39.02; heading rates of 15 p.c., B.P. and 20 p.c., M.F.N., should apply when the product is deemed to be made in Canada.⁽¹⁾ I.F. Slessor asked for free entry for "cast polymethyl methacrylate sheets, not further processed than trimmed, and untrimmed", under heading 39.02; once the market warrants production in Canada, the heading rates of 15 p.c., B.P. and 15 p.c., M.F.N. should apply.⁽²⁾ Imperial Chemical Industries proposed the continuation of present free entry under the British Preferential Tariff for cast polymethyl methacrylate sheet; if and when manufacture should start in Canada, the company would not object to "the proposed rates of duty", but it did not specify which proposed rates.⁽³⁾ Tek Plastics suggested that, as there is no Canadian manufacture of cast sheets, a change in the present duty-free status is unnecessary and undesirable. The company added that it was not opposed to the imposition of duties (no rates specified) on this material should a facility for its manufacture be established in Canada "when and if the market is sufficiently developed to make such a move economically feasible."⁽⁴⁾ In its letter of May 16, 1963, Mitsubishi Rayon recommended that no duty be imposed on polymethyl methacrylate cast sheets, regardless of origin, basing its proposal on there being no manufacture in Canada. The company suggested that the Canadian market was too small to justify integrated production and that it might not even be economic to produce polymerized forms in Canada from imported monomer.

G.M. Plastics, considering extruded and cast sheets to be competitive, recommended distinctions on the basis of the surface of the sheets, as follows: polymethyl methacrylate sheets, plain, to be

(1) Transcript, Vol. 150, p. 22264

(2) Same, Vol. 150, p. 22287

(3) Same, Vol. 150, p. 22290

(4) Same, Vol. 151, p. 22392-3

dutiable at 10 p.c. under both the British Preferential and Most-Favoured-Nation Tariffs and polymethyl methacrylate sheets when laminated, printed, embossed, decorated or otherwise surface-worked to be dutiable at 30 p.c. under both Tariffs.

Although there is no published information on domestic production of cast sheets, the fact that it is made means, of course, that the proposals for free entry must be considered in the new context. The Mitsubishi Rayon proposal, while premised on lack of Canadian production, was not limited to this situation, whereas the others, by a specific proviso, were so limited. All the companies had pointed out that the imposition of a duty on a product not made in Canada would simply increase the cost to Canadian consumers and make their competitive position more difficult against possible imports of finished products. Tek Plastics also opposed the introduction of any margin of British Preference on the ground that this "would force Canadian manufacturers to buy, at a higher price from other foreign countries, certain ranges of sheets not available in the U.K." (1)

In their written submissions, none of the companies gave reasons for particular rates when cast sheets are produced in Canada. Under questioning by the Board, the spokesman for Rohm & Haas, the only company represented at the hearing, said:

"We would be happy with any other levels. 15 and 20 was selected for the purposes of this submission simply because we want to be consistent with the Committee's adopted 15 and 20 Heading rates. It could be 10 or 15 as far as that is concerned; it would not matter to us... Assuming that it was the Rohm and Haas Company of Canada who was making the sheet, naturally we would want an adequate level of protection..." (2)

The case presented by G.M. Plastics was based on the competition between cast and extruded sheets. The company, at the time of the hearing, had not marketed extruded, plane-surface sheet, but claimed that it could produce and sell it if given the duty requested. Its spokesman suggested that because of slight differences in the quality and in processing, it would be necessary to offer the extruded sheet at a price about 15 per cent below that of cast sheet. His company could absorb a 5 p.c. differential and required the proposed increase in duty from Free to 10 p.c. to provide the balance. He claimed that 30 p.c. was required on patterned sheet to offset the higher unit cost of rolls in Canada than in the U.S.A. because of the much shorter runs in this country.

The suppliers and the user of cast sheets contended that extruded sheet was not substitutable for cast sheet over the entire range of uses. It was pointed out that less than 5 per cent of the market was being served by imported extruded sheet; that it was not practical to extrude sheet in many of the thicknesses required, particularly over 3/16 inch, and there are limits to the width of sheet

(1) Transcript, Vol. 151, p. 22393

(2) Same, Vol. 150, p. 22277-8

extruded in Canada. Tek Plastics, in particular, claimed that its equipment was not suitable for the fabrication of extruded sheet into signs.

At the public hearing there was a lengthy discussion of the terminology used by G.M. Plastics to distinguish between those sheets for which the company proposed a duty of 10 p.c., and those for which it suggested 30 p.c. The consensus of opinion appeared to be that the 10 p.c. rate should apply to any sheets with a plane surface, even if they were coloured in the process of manufacture, or were painted. The 30 p.c. rate was intended for those with an uneven or patterned surface. The spokesman for G.M. Plastics, however, summed up his position as follows:

"We are talking about two distinctly different products as regards end-usage. As we are discussing the area of plane, or smooth, flat surface, as opposed to embossed, laminated, printed or patterned surfaces, one material, the first mentioned, the plane, flat, smooth material, is used in the sign industry...The embossed, rough surface material, the laminated material, sometimes printed, other surface treatment, perhaps etching, something of this manner, is generally used not in the sign industry but in the lighting industry, and for reasons of controlling light you adjust the surface of the methyl methacrylate sheet. You may deform it, either post-operatively or in the initial process. You may paint the sides or laminate the sides...Or you may emboss the surface to control the light downwards, sideways, and so on.

"In the first case, where the present Canadian market uses four million pounds of flat plain sheet in cast form, there is no extruded sheet produced in Canada now. This is the material for which we have made a recommendation of 10 per cent protection.

"In the second case of the post-treated embossed pattern, not always post-treated because it might be right in the process, but it has changed from this flat plain surface by the process itself, by embossing, by laminating, by painting, by other surface treatments you manipulate light, and on this material we have recommended a 30 per cent treatment."(1)

With the commencement of the production of cast sheets in Canada, the importance of the question of whether there should be any tariff differentiation based on process of manufacture has lessened, if not disappeared.

G.M. Plastics Limited made no request for the continued free entry of the polymethyl methacrylate resins used for extrusion, although the cost of the resin was said to represent about 58 to 60 per cent of the selling price of the extruded patterned sheet.⁽²⁾ These polymers would, however, be covered by the proposed free entry for acrylic resins discussed in the preceding sections of this part of the report.

(1) Transcript, Vol. 150, p. 22327-8

(2) Same, Vol. 150, p. 22299

Assuming continued free entry of the resins, the company appears to be requesting approximately 75 p.c. protection in its upgrading of the resin, to cover the additional costs of rolls, any diseconomies of scale and the lack of continuous production in Canada. No actual measure of the disabilities is available to the Board.

Canadian Buttons Limited referred to "cast polymethylacrylic sheets filled with a pearl essence" used in the manufacture of buttons, which is admitted duty-free under tariff item 905(d). The company stated that this product is not made in Canada and proposed continuation of duty-free entry.⁽¹⁾

Polyacrylate Film

In its general submission to the Board, on resins and plastics, Minnesota Mining and Manufacturing of Canada Limited listed a number of materials not produced in Canada and imported by the company for further manufacture or resale in Canada. The company proposed rates of 15 p.c., B.P. and 20 p.c., M.F.N. for heading 39.02, with free entry, until there is Canadian production, of all products of the heading not now made in Canada including certain specified materials,⁽²⁾ each of which is dealt with in the appropriate sections of this report. In amplifying the list of products under 39.02, in subsequent correspondence with the Board, the company defined one of these as:

"A polyvinyl chloride or polyacrylate film including laminates thereof, coated with adhesive, with protective liner, when imported in rolls or sheets, for conversion into commercial emblems, traffic sign faces or other markings."

The company has advised the Board that, while it cannot be certain, it believes the polyacrylate film to be polymethyl methacrylate, pointing out that it differs from the polymethyl methacrylate sheet produced in Canada in thickness, being in the film category of less than .005 inch thick.

OTHER RESINS OF HEADING 39.02

In addition to the polymerization and copolymerization products discussed above, a number of other resins are classified under heading 39.02 of the Brussels Tariff Nomenclature. Two groups which were drawn to the attention of the Board in the course of the public hearings are the low molecular weight hydrocarbon resins and the fluorocarbon resins.

Materials mentioned by the Canadian Textiles Institute as binders for pigments and inks might be classified under heading 39.02; this submission has been noted in the part of the report on "Other Resins of Heading 39.01."

⁽¹⁾ Transcript, Vol. 161, p. 23972

⁽²⁾ Same, Vol 162, p 24087

Low-Molecular-Weight Hydrocarbon Resins

This term is used to describe a wide range of thermoplastic resins obtained from such materials as the coumarone, indene and other fractions of coal tar distillates, residues from the cracking of crude oil after the removal of the lighter fractions and from beta-pinene, a pine chemical. Initially, the principal source was coal tar distillate, but as consumption outran the supply of raw materials, other sources were sought and the petroleum resins, derived from cracking operations, were developed. The polyterpene resins, on the other hand, are a product of the pine chemicals industry. The materials from which these resins are produced are usually by-products of large scale refining operations.

These resins are polymerization products, characterized by relatively low softening points, usually 100 to 110° Centigrade, although some varieties may run as high as 160° Centigrade. The softer grades may have molecular weights below 1000 though other varieties may run as high as 25,000.

During the course of the public hearings, a number of these resins, products of B.T.N. heading 39.02, were discussed. The coal tar derivatives included coumarone-indene resins, paracoumaron resins and certain resins derived from styrene or its homologs from coal tar; there was also some discussion of so-called asphalt tiles, which are now largely made from coumarone-indene resins. Both polyterpene resins and a wide variety of petroleum resins were also mentioned in submissions to the Board. The different products are discussed separately in the following sections of the report.

Coumarone-Indene Resins

Coumarone-indene resins are low-molecular-weight thermoplastic materials, produced by the copolymerization of the coumarone and indene derivatives of coal tar light oil. They are used in rubber compounding, the production of "asphalt" floor tiles, in paints for concrete, in adhesives, in paper coating and in a variety of other products.

These resins are not produced in Canada and are imported almost exclusively from the United States. The principal use in Canada is said to be in the compounding of rubber: consumption in the production of floor tile and of paints were said to be respectively, the second and third most important markets. Little statistical information is available, although the D.B.S. did publish until 1961 figures of the consumption of these resins by paint and varnish manufacturers:

Consumption of Coumarone-Indene Resins
in the Paint and Varnish Industry, 1957-61

	lb.	\$	\$/lb.
1957	300,779	54,544	.18
1958	398,784	67,460	.17
1959	469,546	75,012	.16
1960	456,726	72,469	.16
1961	513,012	82,000	.16

Source: D.B.S., Cat. No. 46-210

Coumarone-indene resins are usually imported in solid form, but are also shipped in organic solvents. It is understood that the solvent does not usually exceed 40 per cent of the mixture by weight. These resins without admixture are free of duty under both the B.P. and M.F.N. Tariffs under tariff item 901(a)9. If they should be imported as synthetic resins in the form of aqueous emulsions, dispersions or solutions, without admixture, they would also be free of duty under both Tariffs under item 901(b)8. When in organic solvents, and the solvent does not exceed 60 per cent of the mixture by weight, they are dutiable at 10 p.c. ad valorem under both the B.P. and M.F.N. Tariffs under tariff item 901(c)5. The Industry Committee also indicated that it had received information that some coumarone-indene resins are being entered as "carbolic or heavy oil" under tariff item 273c,⁽¹⁾ free of duty under the British Preferential Tariff and dutiable at 10 p.c. under the Most-Favoured-Nation Tariff; this item is not part of Reference 120.

The Canadian Paint Varnish and Lacquer Association Incorporated and Minnesota Mining and Manufacturing Company of Canada Limited both requested free entry, until made in Canada, for coumarone-indene resins, in lumps, powders, granules or flakes.⁽²⁾ The Association made no proposal as to rates that would be appropriate when the products are produced in Canada. Minnesota Mining and Manufacturing suggested that at that time the resins be dutiable at the rates proposed by the company for heading 39.02, namely 15 p.c., B.P., and 20 p.c., M.F.N.⁽³⁾ The Rubber Association of Canada included coumarone-indene resins in the list of plastics materials used by its members for which it proposed that there be no changes in the present tariff treatment.⁽⁴⁾ Dominion Oilcloth and Linoleum Limited, Montreal and the Flintkote Company of Canada, Toronto, which use coumarone-indene resins in the manufacture of floor tiles, also recorded their support for the continuation of free entry for these resins.⁽⁵⁾

(1) Transcript, Vol. 134, p. 19960, 19972

(2) Same, Vol. 150, p. 22357; Vol. 162, p. 24087

(3) Same, Vol. 162, p. 24087

(4) Same, Vol. 123, p. 18394, 18405

(5) Same, Vol. 156, p. 23124, 23149

Two U.S. producers which export these resins to Canada also made representations to the Board. The Pennsylvania Industrial Chemicals Corporation, Clairton, Pennsylvania, requested continuation of the existing tariff treatment of coumarone-indene resins until such time as they are made in Canada,⁽¹⁾ but made no proposals as to the rates to apply when they are made in Canada. The Neville Chemical Company, Pittsburgh, Pennsylvania, in its recommendation that the present tariff treatment be continued,⁽²⁾ referred to the fact that the resins are not made in Canada, but did not limit the application of its proposal to that situation. Both companies pointed out that any increase in duties at the present time would only have the effect of increasing costs to Canadian consumers, and that the duty on resins in solvents has the effect of encouraging the importation of dry resins with the solvent being added in Canada.

The Industry Committee recommended that the tariff provision for any of these resins under item 273c be relocated, without change in rates, as part of a new item based on heading 39.02.⁽³⁾ The Board, however, has been unable to establish that any forms of the resin could be entered under item 273c.

Paracoumaron Resins

Minnesota Mining and Manufacturing Company of Canada Limited also asked for free entry, until made in Canada, for paracoumaron resins in liquid or paste form. If they become made in Canada, the company's proposed heading rates of 15 p.c., B.P., 20 p.c., M.F.N., should apply.

The Board has no particulars as to how these resins differ in properties or uses from coumarone-indene resins. It is understood that their present tariff classification would be the same as for the coumarone-indene resins.

Petroleum Resins

This group of low-molecular-weight resins was developed because of lack of supply of raw materials to increase the production of coumarone-indene resins. They are derived from petroleum distillates by cracking operations; they have widely varying aromatic content, but are used as substitutions or replacements for coumarone-indene resins.

The various types of petroleum resins are available in solid, emulsion and solution forms. They are used to reinforce latex paints, to impart better adhesion and scrubability, for the sizing of paper, in rubber compounding, in the production of water-resistant varnishes and in other industrial uses. They are principally used to modify other synthetic resins.⁽⁴⁾

Low-molecular-weight resins are not produced in Canada and are imported, principally, if not exclusively from the United States.

(1) Transcript, Vol. 135, p. 20171

(2) Same, Vol. 150, p. 22361

(3) Same, Vol. 134, p. 19973

(4) Same, Vol. 135, p. 20184

The spokesman for one U.S. supplier of coumarone-indene resins, low molecular weight styrene resins, petroleum resins and polyterpene resins estimated the Canadian market potential for these products at about 4 to 4½ million pounds annually. It was suggested that this would cover 35 to 40 different grades of products. At the indicated average price of 15 cents per pound, (1) the value of the annual demand would be between \$600,000 and \$700,000.

These petroleum resins are classified under various parts of tariff item 901 as follows:

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
901(a) Synthetic resins, without admixture, including scrap or waste:		
9. Other type	Free	Free
(b) Synthetic resins in the form of aqueous emulsions, aqueous dispersions or aqueous solutions, without admixture		
8. Other type	Free	Free
(c) Synthetic resins in organic solvents where the solvent is not more than 60 per cent by weight, without other admixture:		
5. Other type	10 p.c.	10 p.c.

The Rubber Association of Canada included what it described as petroleum hydrocarbon resins among the products used by its members and covered by the Association's general brief on synthetic resins and plastics. (2) The Association recommended that there be no increase in duties on synthetic resins as these would "inflict crippling cost increases on rubber manufacturers engaged in the production of plastics and plastics products and would seriously restrict the rubber industry's further expansion in the field of plastics production". (3)

The Association also urged that low duties were required to keep Canadian Manufacturers of plastics and plastics products abreast of technological changes and advances in the United States and that the plastics industry was flourishing under the existing tariff structure.

(1) Transcript, Vol. 135, p. 20198, 20206

(2) Same, Vol. 123, p. 18404

(3) Same, Vol. 123, p. 18400-1

Minnesota Mining and Manufacturing Company of Canada Limited recommended free entry until made in Canada for petroleum resins in lumps, powders, granules or flakes. The company suggested, that the products might be described as "petroleum resins produced by the polymerization of dienes and reactive olefines derived from the deep cracking of petroleum". If the products become made in Canada, they should be dutiable at the rates of 15 p.c., B.P. and 20 p.c., M.F.N. proposed by the company for B.T.N. heading 39.02.⁽¹⁾ The company suggested free entry for raw materials not available from Canadian sources, when of significant importance to the Canadian economy to stimulate uses to the point where Canadian manufacture would become economical.

The Pennsylvania Industrial Chemical Corporation which produces, in the United States, a wide variety of low-molecular-weight resins made a submission relating to the range of products the company shipped to Canada. It indicated that a number of these resins could be described as "petroleum resins" in the sense that after removal of all lighter fractions from the petroleum crudes, the residue is isolated and treated; from this material these types of resins are produced.⁽²⁾ The variety of resins made from these residues is indicated by the broad chemical descriptions given by the company to its products: alkyl aromatic, straight chain hydrocarbon, cyclic aromatic and dark aromatic polymer. The Neville Chemical Company, which also ships low-molecular-weight resins to Canada, supplies a series of petroleum resins described as cyclic aromatic.⁽³⁾ As they did with respect to coumarone-indene resins, both Pennsylvania Industrial Chemical and Neville Chemical recommended that, because the petroleum resins which they supply are not produced in Canada, there should be no change in the existing rates of duty. Pennsylvania Industrial Chemical stated that its recommendation was to apply until the resins are produced in Canada, but made no proposal concerning the appropriate rates at that time. The company pointed out that these resins are imported for further processing in Canada and that any increase in duties would simply result in increased costs to Canadian manufacturers. Both companies suggested that the existing duty on resins in solvents encouraged Canadian consumers to import dry resins and add the solvent in Canada.

The principal problem involved in making a tariff provision specifically for these resins appears to be one of definition. In the course of the discussion, it was suggested that the term petroleum resins might be subject to such broad interpretation that it would cover products, produced in Canada, which are quite different from those of interest to the companies making submissions; provision could be made for petroleum hydrocarbon resins "if the names were spelt out."⁽⁴⁾ No detailed suggestions were made to the Board apart from the wording suggested by Minnesota Mining and Manufacturing Company of Canada Limited. Inquiries made by the Board suggest that the term "petroleum resins" is generally understood to refer to the low-molecular-weight products to which the various submissions related.

(1) Transcript, Vol. 162, p. 24087

(2) Same, Vol. 135, p. 20177

(3) Same, Vol. 150, p. 22360

(4) Same, Vol. 123, p. 18438

The only other opposition to the proposals for these products came from those who proposed rates for the heading without exception. The spokesman for Shawinigan Chemicals suggested that the Board might wish to consider whether any of the petroleum resins can be used in formulations in partial replacement of Canadian-made resins. No details were given, however, of the extent to which this is possible.

Polyterpene Resins

These thermoplastic resins are produced by the catalytic polymerization of beta-pinene, a material derived from the distillation of turpentine. They have molecular weights of approximately 1200. They are said to offer unique properties in the field of low-molecular-weight resins, owing to their lower density, than coal-tar or petroleum resins. As they are more expensive than the other hydrocarbon resins, they must justify their use by their special properties in any given application. They are used in the production of adhesives and coatings, drying oils and varnishes, emulsion waxes, concrete curing and rubber compounding.

The Board has no statistical data concerning the importation or consumption of these resins. They are not produced in Canada and are imported from the United States. They are classified as "other" resins under the same tariff items as now apply to coumarone-indene and petroleum resins.

Polyterpene resins were covered by most of the submissions relating to coumarone-indene resins and petroleum resins, with the same arguments being advanced. The Rubber Association of Canada proposed that there be no change in the present tariff status of these products.⁽¹⁾ The Pennsylvania Industrial Chemical Corporation proposed that the present tariff treatment be continued until such time as the resins are produced in Canada, but made no suggestion as to the rates to apply at that time. In its public submission, Minnesota Mining and Manufacturing Company of Canada Limited proposed, as an exception to B.T.N. heading 39.01, free entry for these resins until made in Canada.⁽²⁾ By correspondence, the company subsequently altered this proposal to its correct location under heading 39.02, asking for free entry until made in Canada for polyterpene resins in lump, powder, granule or flake form. The company also suggested that when the resin is made in Canada, the rates proposed by it for the heading, 15 p.c., B.P., 20 p.c., M.F.N. apply.

"Asphalt" Floor Tiles

The product called "asphalt tile" is now no longer produced chiefly from asphalt which has been replaced as a binder by low-molecular-weight resins, particularly coumarone-indene resins. When resins are used, the tile consists of about 25 parts by weight of a resin and plasticizer and about 75 parts by weight of fillers and pigments. The fillers typically consist of about 35 per cent asbestos fibres, 60 per cent ground limestone and about 5 per cent pigments.⁽³⁾ For the

(1) Transcript, Vol. 123, p. 18405

(2) Same, Vol. 162, p. 24086

(3) Encyclopaedia Britannica, 1962 Edition, Vol. 9, p. 387

purposes of the B.T.N., tiles consisting of synthetic resins of heading 39.02, with fillers and colouring matter, made by cutting sheets into rectangles, remain under this heading.

Asphalt and gilsonite are still used to produce certain dark-coloured tiles, particularly for industrial purposes. Coal-tar and petroleum resins are used to produce all colours of tile, and polystyrene is sometimes added to these resins to produce a suitable resin. It is assumed, therefore, that the term "asphalt tile" should now relate to certain tiles made from synthetic resins as well as asphalt.

There are four Canadian producers of asphalt tiles: Building Products Limited, LaSalle, Quebec; Armstrong Cork Canada, Limited, Montreal, Quebec; Dominion Oilcloth & Linoleum Co., Limited, Montreal, Quebec; and The Flintkote Company of Canada Limited, Toronto, Ontario. The latter two companies made submissions to the Board in which they mentioned asphalt tiles, although their concern was primarily with other products.

In its submission, Flintkote pointed out that sales of asphalt tiles, in Canada are dropping from year to year and that in 1962 they accounted for only $7\frac{1}{2}$ per cent of the company's sales footage of asphalt and vinyl-asbestos tiles and only $4\frac{1}{2}$ per cent of net dollar sales.⁽¹⁾ This decline is reflected in the figures published by the D.B.S. for recent years:

Production and Shipments of "Asphalt Tile", 1959-65

	<u>Production</u>	<u>Shipments</u>	
	'000 sq. ft.	'000 sq. ft.	\$'000
1959	18,902	17,743	2,028
1960	16,006	15,484	1,582
1961	12,387	12,232	1,071
1962	8,711	8,967	871
1963	6,684	6,763	707
1964	4,339	3,843	..
1965	..	1,593	..

Source: D.B.S., Cat. No. 47-001; 36-201; 36-205

The decline in the market for asphalt tile in Canada is also reflected in the import statistics, although again it is not clear to which form of tile the figures apply:

Imports of "Asphalt Tile", 1955-64

	'000 sq. ft	\$'000	\$/sq. ft.
1955	2,351	204	.09
1956	2,412	267	.11
1957	966	92	.10
1958	962	101	.11
1959	983	93	.10
1960	627	66	.11
1961	971	97	.10
1962	541	59	.11
1963	122	14	.12
1964	71	6	.09

Source: D.B.S., Trade of Canada, Imports

Except in 1955, all the above imports came from the United States. No information is available concerning exports, if any, from Canada.

Asphalt tiles containing synthetic resin are dutiable under Tariff Item 908:

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
908 Manufactures of synthetic resins including floor and wall tile containing synthetic resin, n.o.p.....	15 p.c.	20 p.c.

In their submissions, which were directed principally to other products, both Dominion Oilcloth and Flintkote indicated that, given the continued free entry of coumarone-indene resins, no change would be requested in the rates applicable to asphalt tiles under tariff item 908. If the rates on raw materials were increased, the companies indicated that increases would be required in the protection on the products to offset increased raw material costs and to continue to meet foreign competition.⁽¹⁾

The statistics above suggest that the Canadian producers have for several years held considerably more than 90 per cent of the market for asphalt tiles.

⁽¹⁾ Transcript, Vol. 156, p. 23096-7; 23150-1

FLUOROCARBON RESINS

This term is used to describe a group of resins derived from the polymerization of fluorine together with monomers which contain hydrocarbons, usually ethylene or propylene. In some monomers, chlorine replaces some of the fluorine. Typical products of the group are polytetrafluoroethylene, polychlorotrifluoroethylene, polvinylidene fluoride and copolymers of tetrafluoroethylene and hexafluoropropylene.

The products are noted for their remarkable heat and chemical resistance which makes them useful in a wide range of chemical, mechanical and electrical applications.

Polytetrafluoroethylene was the only product of the group on which the Board received specific representations. Its exceptional chemical resistance, good dielectrical properties and very low coefficient of friction make it useful in the production of gaskets, packings and thread sealings, linings for pipes and other equipment in chemical plants, valve-holders and bearings, as a wire insulation in electronic applications and as a coating for housewares such as non-stick frying pans.

There are no fluorocarbon resins produced in Canada, the market being supplied by imports from the United States and Britain. No published statistical information is available, but the Canadian market for polytetrafluoroethylene resins, in powder form for moulding and extruding, or in dispersion (coloured or colourless) for coating or impregnation, was estimated to have grown from 5 tons in 1960 to 15 tons in 1962. Britain was said to have supplied 20 per cent of the requirements in 1962. As the product was said to sell at about \$4.00 per pound, the Canadian market in 1962 appears to have consumed about \$120,000 worth of polytetrafluoroethylene resins.

The principal suppliers of the Canadian market for polytetrafluoroethylene are E.I. DuPont de Nemours Company Incorporated in the United States and Imperial Chemical Industries Limited in Britain.

In its general brief on plastics, Minnesota Mining and Manufacturing Company of Canada Limited included among the products not made in Canada and of interest to the company fluorocarbon resins, oils, greases, waxes and rubber, and also, specifically, monochlorotrifluoroethylene resins, oils, greases, waxes and rubber.

Fluorocarbon resins are currently dutiable as follows: when without admixture, free of duty under both the B.P. and M.F.N. Tariffs under item 901(a)9; when in aqueous dispersion with admixture, free under both Tariffs under item 901(b)8; when with admixture for use in moulding or extruding, free under both Tariffs under item 902(f); and when with admixture, for purposes other than those described in item 902, usually at 15 p.c. under both Tariffs, under tariff item 904, or at 15 p.c., B.P., and 20 p.c., M.F.N., under tariff item 220a(i).

Imperial Chemical Industries Limited requested "continuation of the current freedom from duty under the British Preferential Tariff" for polytetrafluoroethylene resins until such time as they are made in Canada. At that time, the company would not object to the proposed

rates for heading 39.02.(1) In a letter to the Board subsequent to the hearings, Minnesota Mining and Manufacturing Company indicated that its proposal for monochlorotrifluoroethylene could be combined with that for fluorocarbons, restricted to forms that would fall under heading 39.02. The recommendation, therefore, is for free entry until made in Canada for fluorocarbon resins in lump, powder, granule or flake form. If there should be Canadian production, the company proposed that the heading rates of 15 p.c., B.P. and 20 p.c., M.F.N. apply.

The general proposals for rates of duty for all products of heading 39.02 would include these products, as would the general proposals for no change in the existing rates.

The principal argument advanced in favour of free entry for these resins was that, as they are not produced in Canada, any increase in duties would penalize the Canadian industrial user by raising the price of his raw material. It would thus make more attractive the importation of finished products instead of resin for processing in Canada.

POLYSULPHIDE RESINS

In its general submission on resins and plastics, Minnesota Mining and Manufacturing of Canada Limited listed "polysulphide resins in liquid or paste form" under heading 39.02.(2) It is understood, however, that both in the Canadian Customs Tariff and the B.T.N. these products are classified as synthetic rubber and they are, therefore, not considered in Reference 120.

(1) Transcript, Vol. 150, p. 22371

(2) Same, Vol. 162, p. 24087-8

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Table 1

Imports of Synthetic Resins and Plastics Materials
of B.T.N. Chapter 39, 1962-64

	1962		1963		1964	
	'000 lb. ♀ '000	'000 lb. ♀ '000	'000 lb. ♀ '000	'000 lb. ♀ '000	'000 lb. ♀ '000	'000 lb. ♀ '000
<u>39.01</u>						
Phenol-formaldehyde resins	7,462	2,303	6,482	1,850	7,911	2,116
Melamine-formaldehyde resins	6,569	2,467	6,045	2,231	4,658	1,637
Amino-aldehyde resins, n.e.s.	9,943	2,327	12,707	2,692	15,016	2,836
Polyester resins (alkyd and allyl)	6,966	2,550	7,057	2,486	7,991	2,821
Epoxy resins	..	..	2,278	1,367	2,214	1,412
Synthetic resin glue	2,871	1,168	3,403	1,385	3,810	1,525
Total, 39.01	33,811	10,815	37,972	12,011	41,600	12,347
<u>39.02</u>						
Polypropylene resins	..	..	6,363	1,878	9,275	2,286
Polyethylene resins	27,146	7,604	22,437	5,332	26,669	6,248
Acrylonitrile-butadiene- styrene resins	3,496	1,577	5,084	2,292	5,544	2,380
Polystyrene resins, n.e.s.	9,792	2,682	9,543	2,497	10,407	2,732
Acrylic resins	12,010	4,242	13,534	5,087	14,594	5,301
Vinyl chloride resins	32,440	6,197	34,171	6,381	42,774	8,446
Vinyl resins, n.e.s.	12,301	3,954	13,984	4,764	12,490	4,637
Sub-total, resins, 39.02	97,185	26,256	105,116	28,231	121,753	32,030
Polyethylene film and sheet	3,105	2,348	3,803	2,175	4,647	2,275
Acrylic film and sheet	4,904	3,589	4,376	3,116	6,160	4,167
Vinyl chloride film and sheet	4,040	2,162	8,225	3,941	6,085	3,124
Vinyl butyral film and sheet	963	1,418	1,024	1,524	1,161	1,709
Vinyl film and sheet, n.e.s.	5,399	3,721	4,278	2,748	5,231	3,336
Sub-total, film and sheet, 39.02	18,411	13,238	21,706	13,504	23,284	14,611
Floor and wall tiles, asphalt ^(a)	541	59	122	14	71	6
Floor and wall tiles, vinyl- asbestos ^(a)	4,446	726	4,592	725	3,369	336
Sub-total, tiles, 39.02	4,987	785	4,714	739	3,440	342
Total, 39.02 (excluding tiles)	115,596	39,494	126,822	41,735	145,037	46,641

Table 1
(Cont'd)

	<u>1962</u>		<u>1963</u>		<u>1964</u>	
	'000 lb. \$	'000	'000 lb. \$	'000	'000 lb. \$	'000
<u>39.03</u>						
Cellulose nitrate, except explosive grades	5,693	1,804	5,529	1,790	6,158	1,942
Cellulose acetate	3,438	1,052	3,563	1,109	2,881	888
Cellulose acetate butyrate	1,371	870	1,557	995	1,647	1,040
Cellulose plastics, n.o.p., including cellulose plastics scrap and waste	2,954	1,512	3,136	1,554	3,747	1,857
Sub-total, resins, 39.03	13,456	5,238	13,785	5,448	14,433	5,727
Sheet cellulose acetate, in rolls, for the manufacture of sensitized photographic film	699	930	816	1,151	776	1,181
Cellulose acetate film and sheet, n.e.s.	2,952	2,999	2,751	2,936	2,776	2,751
Regenerated cellulose film and sheet	2,445	1,382	1,259	806	1,602	939
Cellulosic film and sheet, n.e.s.	359	418	265	365	696	907
Sub-total, film and sheet, 39.03	6,455	5,729	5,091	5,258	5,850	5,778
Total, 39.03	19,911	10,967	18,876	10,706	20,283	11,505
<u>39.05</u>						
Synthetic resins derived from natural resins or tall oil	14,370	2,845	11,940	2,809	12,858	2,899
Unallocated resins and plastics materials						
Synthetic resins, n.e.s., including synthetic resin scrap and waste	26,589	9,211	22,793	7,060	32,590	10,036
Plastics materials, not shaped, n.e.s.	23	9	7	4	100	69
Plastic film and sheet, n.e.s.	2,727	4,658	2,807	5,056	4,132	6,660
Layflat tubing, plastic	245	205	163	146	216	161
Pipe, tubes and rigid or semi-rigid tubing, plastic (except laminated)	1,219	1,043	1,162	1,085	1,205	1,139
Blocks, rods, bars, angles, channels and similar shapes, plastic (except expanded or laminated)	231	333	305	369	265	377

Table 1
(Cont'd)

	1962		1963		1964	
	'000 lb.	\$'000	'000 lb.	\$'000	'000 lb.	\$'000
Foamed and expanded plastics, basic shapes and forms	2,804	2,110	1,919	1,259	1,416	1,122
Laminated plastics materials, fabric base	546	453	855	567	785	749
Laminated plastics materials, n.e.s.	2,254	1,602	2,726	1,817	2,851	1,816
Plastic sheet, reinforced (except laminated)	4,789	1,860	1,387	1,166	1,128	883
Total, unallocated resins and plastics materials	41,427	21,484	34,124	18,529	44,688	23,012
Total Known Resins and plastics materials, B.T.N. 39(b)	225,115	86,390	229,734	86,529	264,466	96,746

(a) Quantity reported in square feet

(b) Quantity data do not include floor and wall tiles

Source: D.B.S., Trade of Canada, Imports

Table 2

Imports: Phenol-formaldehyde resins, s.c. 8602^(a)

Tariff Items 901(a)1, 901(b)1, 901(c)1, 901(d)2, 902(a), 904 and 925

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1962	7,462	2,303	.31	2,194	297,869	13.6
1963	6,482	1,850	.29	1,641	201,453	12.3
1964	7,911	2,116	.27	1,975	218,400	11.1
<u>2. United Kingdom</u>						
1962	55	21	.37	17	2,166	12.6
1963	41	18	.43	18	1,653	9.4
1964	77	33	.43	33	3,553	10.7
<u>3. United States</u>						
1962	7,382	2,270	.31	2,165	294,217	13.6
1963	6,352	1,815	.29	1,617	198,958	12.3
1964	7,798	2,079	.27	1,940	214,655	11.1

(a) Prior to 1962 included in s.c. 8750, 8770, 8800, 8850; beginning in 1964 renumbered as s.c. 423-02

Table 3

Imports: Melamine-formaldehyde resins, s.c. 8604^(a)

Tariff Items: 901(a)2, 901(b)2, 901(c)2, 901(d)1 and 902(f)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	p.c. of
				(000)		Dutiable
						Value
<u>1. Total</u>						
1962	6,569	2,467	.38	1,181	71,666	6.1
1963	6,045	2,231	.37	716	54,504	7.6
1964	4,658	1,637	.35	231	32,904	14.2
<u>2. United Kingdom</u>						
1962	144	38	.27	2	155	7.2
1963	36	9	.25	*	5	4.7
1964	4	1	.40	-	-	-
<u>3. United States</u>						
1962	6,241	2,372	.38	1,124	65,088	5.8
1963	5,813	2,151	.37	716	54,499	7.6
1964	4,554	1,574	.35	171	24,001	14.0

(a) Prior to 1962 included in s.c. 8750, 8770, 8800; beginning in 1964 renumbered as s.c. 423-04

Table 4

Imports: Amino-aldehyde resins, n.o.p., s.c. 8609^(a)

Tariff Items 901(a)2, 901(b)2, 901(c)2, 901(d)1 and 902(f)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1962	9,943	2,327	.23	1,251	86,163	6.9
1963	12,707	2,692	.21	886	71,491	8.1
1964	15,016	2,836	.19	395	49,727	12.6
<u>2. United Kingdom</u>						
1962	1,872	368	.20	207	10,359	5.0
1963	1,815	379	.21	93	4,954	5.3
1964	1,847	404	.22	35	4,409	12.5
<u>3. United States</u>						
1962	7,624	1,838	.24	971	68,826	7.1
1963	8,658	2,056	.24	758	63,265	8.3
1964	9,488	2,065	.22	328	41,365	12.6
<u>4. Germany, Fed. Rep. of</u>						
1962	212	69	.33	44	5,505	12.6
1963	1,889	195	.10	20	2,504	12.3
1964	3,495	325	.09	30	3,779	12.5

(a) Prior to 1962 included in s.c. 8750, 8770, 8800; beginning in 1964 renumbered as s.c. 423--09

Table 5

Imports: Polyester resins (alkyd and allyl), s.c. 8613^(a)

Tariff Items 901(a)3, 901(b)3, 901(c)3, 901(d)2, 902(b) and 904

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1962	6,966	2,550	.37	2,449	292,077	11.9
1963	7,057	2,486	.35	2,313	243,094	10.5
1964	7,991	2,821	.35	2,452	199,665	8.1
<u>2. United Kingdom</u>						
1962	50	38	.75	24	1,505	6.3
1963	85	56	.66	27	2,203	8.2
1964	159	95	.60	24	2,885	11.9
<u>3. United States</u>						
1962	6,899	2,504	.36	2,417	289,779	12.0
1963	6,953	2,423	.35	2,279	240,153	10.5
1964	7,764	2,702	.35	2,404	194,244	8.1

(a) Prior to 1962 included in s.c. 8750, 8770, 8800, 8850; beginning in 1964 renumbered as s.c. 423-13

Table 6

Imports: Epoxy resins, s.c. 8630(a)(b)

Tariff Items 901(a)9, 901(b)8, 901(c)5, 901(d)2, 902(f) and 904

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1963	2,278	1,367	.60	565	60,998	10.8
1964	2,214	1,412	.64	388	52,136	13.4
<u>2. United Kingdom</u>						
1963	122	35	.29	35	5,227	14.8
1964	114	45	.40	45	6,235	14.0
<u>3. United States</u>						
1963	2,156	1,331	.62	529	55,751	10.5
1964	2,098	1,366	.65	343	45,901	13.4

(a) Prior to 1963 included in s.c. 8649; beginning in 1964 renumbered as s.c. 423-30

(b) s.c. 8630 was in use prior to 1962 with a content dissimilar to that of the present class.

Table 7

Imports: Synthetic resin glue, s.c. 8431^(a)

Tariff Item 903

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1953	1,376	434	.32	434	75,353	17.4
1954	1,555	483	.31	483	84,670	17.5
1955	1,487	483	.32	483	84,447	17.5
1956	1,836	570	.31	570	99,717	17.5
1957	2,461	777	.32	774	135,380	17.5
1958	2,837	886	.31	885	154,729	17.5
1959	3,310	979	.30	977	171,063	17.5
1960	2,963	972	.33	971	170,146	17.5
1961	2,899	1,061	.37	1,061	185,862	17.5
1962	2,871	1,168	.41	1,167	232,958	20.0
1963	3,403	1,385	.41	1,383	258,219	18.7
1964	3,810	1,525	.40	1,502	257,131	17.1
<u>2. United Kingdom</u>						
1953	49	23	.47	23	3,508	15.0
1954	3	1	.28	1	142	15.0
1955	7	1	.16	1	163	15.0
1956	1	*	.31	*	31	15.0
1957	5	1	.19	1	146	15.0
1958	11	4	.36	4	627	15.0
1959	8	5	.66	4	589	15.0
1960	21	13	.61	13	1,924	15.0
1961	18	12	.67	12	1,822	15.0
1962	25	17	.66	17	2,970	17.7
1963	24	13	.53	13	1,980	15.3
1964	42	23	.55	22	2,876	13.0

Table 7
(Cont'd)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>3. United States</u>						
1953	1,321	407	.31	407	71,281	17.5
1954	1,545	479	.31	479	84,134	17.6
1955	1,472	479	.33	479	83,802	17.5
1956	1,822	562	.31	562	98,415	17.5
1957	2,443	769	.31	766	134,086	17.5
1958	2,809	876	.31	874	152,954	17.5
1959	3,283	966	.29	966	169,231	17.5
1960	2,913	948	.33	947	166,262	17.5
1961	2,841	1,032	.36	1,031	181,026	17.6
1962	2,820	1,139	.40	1,138	227,543	20.0
1963	3,335	1,346	.40	1,344	251,528	18.7
1964	3,695	1,469	.40	1,454	249,660	17.2

(a) Beginning in 1964 renumbered as s.c. 421-59

Table 8

Imports: Polypropylene resins, s.c. 8615^(a)

Tariff Items 901(a)9, 901(b)8, 901(c)5, 901(d)2, 902(f) and 904

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	<u>Value</u>
				(000)		
	<u>1. Total</u>					
1963	6,363	1,878	.30	497	27,169	5.5
1964	9,275	2,286	.25	52	5,400	10.3

2. United States

1963	6,363	1,878	.30	497	27,169	5.5
1964	9,275	2,286	.25	52	5,400	10.3

(a) Prior to 1963 included in s.c. 8649; beginning in 1964 renumbered as s.c. 423-15

Table 9

Imports: Polyethylene resins, s.c. 8616^(a)

Tariff Items 901(a)8, 901(b)8, 901(c)5, 901(d)2 and 902(e)

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1962	27,146	7,604	.28	7,361	731,552	9.9
1963	22,437	5,332	.24	5,070	453,499	8.9
1964	26,669	6,248	.23	5,815	464,288	8.0
<u>2. United Kingdom</u>						
1962	233	151	.53	136	13,552	10.0
1963	377	118	.31	118	9,338	7.9
1964	860	311	.36	310	31,034	10.0
<u>3. United States</u>						
1962	25,541	7,209	.28	6,980	696,095	10.0
1963	20,608	4,922	.24	4,665	419,459	9.0
1964	25,567	5,878	.23	5,484	431,777	7.9

(a) Prior to 1962 included in s.c. 8750, 8770, 8800; beginning in 1964 renumbered as s.c. 423-16

Table 10

Imports: Acrylonitrile-butadiene-styrene resins, s.c. 8617^(a)

Tariff Items 901(a)9, 901(d)2 and 902(f)

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1962	3,496	1,577	.45	788	41,259	5.2
1963	5,084	2,292	.45	540	27,848	5.2
1964	5,544	2,380	.43	9	972	10.8
<u>2. United States</u>						
1962	3,496	1,577	.45	788	41,259	5.2
1963	5,076	2,289	.45	539	27,777	5.2
1964	5,544	2,380	.43	9	972	10.8

^(a) Prior to 1962 included in s.c. 8750, 8800; beginning in 1964 renumbered as s.c. 423-17

Table 11

Imports: Polystyrene resins, n.o.p., s.c. 8619^(a)

Tariff Items 901(a)5, 901(b)5, 901(d)2, 902(c) and 907

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1962	9,792	2,682	.27	2,613	280,773	10.7
1963	9,543	2,497	.26	2,409	235,932	9.8
1964	10,407	2,732	.26	2,519	228,477	9.1
<u>2. United States</u>						
1962	9,568	2,623	.27	2,556	273,760	10.7
1963	8,996	2,334	.26	2,253	220,899	9.8
1964	9,172	2,362	.26	2,150	191,506	8.9

^(a) Prior to 1962 included in s.c. 8750, 8770, 8800, 8830; beginning in 1964 renumbered as s.c. 423-19

Table 12

Imports: Acrylic resins, s.c. 8621^(a)

Tariff Items 901(a)9, 901(b)8, 901(c)5, 901(d)2, 902(f) and 904

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1962	12,010	4,242	.35	2,785	283,770	10.2
1963	13,534	5,087	.38	2,443	282,452	11.6
1964	14,594	5,301	.36	1,970	251,379	12.8
<u>2. United Kingdom</u>						
1962	234	114	.49	59	3,016	5.1
1963	14	8	.56	3	174	5.0
1964	127	59	.47	*	41	14.7
<u>3. United States</u>						
1962	11,599	4,055	.35	2,664	277,525	10.4
1963	13,046	4,887	.37	2,434	281,954	11.6
1964	13,990	5,074	.36	1,968	251,222	12.8

(a) Prior to 1962 included in s.c. 8750, 8770, 8800, 8850; beginning in 1964 renumbered as s.c. 423-21

Table 13

Imports: Vinyl chloride resins, s.c. 8624(a)

Tariff Items 901(a)6, 901(b)6, 901(c)5, 901(d)2 and 902(d)

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1962	32,440	6,197	.19	6,147	603,818	9.8
1963	34,171	6,381	.19	6,318	472,124	7.5
1964	42,774	8,446	.20	7,974	491,939	6.2
<u>2. United Kingdom</u>						
1962	1,765	335	.19	323	25,773	8.0
1963	1,325	247	.19	247	14,523	5.9
1964	767	139	.18	139	7,379	5.3
<u>3. United States</u>						
1962	17,004	4,128	.24	4,095	414,915	10.1
1963	19,695	4,414	.22	4,355	360,438	8.3
1964	28,890	6,412	.22	5,944	389,089	6.5
<u>4. Japan</u>						
1962	5,291	653	.12	653	58,824	9.0
1963	6,332	742	.12	742	42,065	5.7
1964	2,889	338	.12	338	17,426	5.2
<u>5. Italy</u>						
1962	7,889	992	.13	992	96,089	9.7
1963	3,997	548	.14	548	32,493	5.9
1964	6,899	993	.14	993	49,701	5.0

(a) Prior to 1962 included in s.c. 8750, 8770, 8800; beginning in 1964 renumbered as s.c. 423-24

Table 14

Imports: Vinyl resins, n.o.p., s.c. 8629^(a)

Tariff Items 901(a)6, 901(a)9, 901(b)6, 901(b)8, 901(c)5, 901(d)2,
902(d) and 902(f)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	<u>Dutiable</u>
				(000)		<u>Value</u>
<u>1. Total</u>						
1962	12,301	3,954	.32	3,472	287,226	8.3
1963	13,984	4,764	.34	3,344	241,437	7.2
1964	12,490	4,637	.37	2,810	189,436	6.7
<u>2. United States</u>						
1962	9,868	3,427	.35	2,956	243,464	8.2
1963	12,151	4,248	.35	2,958	221,159	7.5
1964	11,217	4,060	.36	2,474	171,620	6.9

(a) Prior to 1962 included in s.c. 8750, 8770, 8800; beginning in
1964 renumbered as s.c. 423-29

Table 15

Imports: Polyethylene film and sheet, s.c. 8716^(a)

Tariff Items 905(c)1, 905(c)2 and 906(e)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1962	3,105	2,348	.76	2,310	425,532	18.4
1963	3,803	2,175	.57	2,173	319,529	14.7
1964	4,647	2,275	.49	2,270	304,201	13.4
<u>2. United Kingdom</u>						
1962	2	1	.64	1	236	16.1
1963	1	1	.96	*	28	9.5
1964	2	3	1.47	1	196	13.2
<u>3. United States</u>						
1962	3,098	2,345	.76	2,307	424,976	18.4
1963	3,794	2,166	.57	2,164	318,264	14.7
1964	4,633	2,268	.49	2,264	303,386	13.4

(a) Prior to 1962 included in s.c. 8870; beginning in 1964 renumbered as s.c. 424-16

Table 16

Imports: Acrylic film and sheet, s.c. 8721^(a)

Tariff Items 905(b) and 906(b)

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1962	4,904	3,589	.73	1,934	100,097	5.2
1963	4,376	3,116	.71	918	47,160	5.1
1964	6,160	4,167	.68	46	7,702	16.6
<u>2. United Kingdom</u>						
1962	1,212	830	.68	513	25,645	5.0
1963	1,059	725	.68	134	6,712	5.0
1964	2,572	1,663	.65	19	2,800	15.0
<u>3. United States</u>						
1962	2,602	2,022	.78	971	51,897	5.3
1963	2,135	1,629	.76	513	26,903	5.2
1964	2,307	1,694	.73	28	4,902	17.7
<u>4. Germany, Fed. Rep. of</u>						
1962	958	664	.69	389	19,460	5.0
1963	731	510	.70	186	9,327	5.0
1964	950	637	.67	-	-	-
<u>5. Japan</u>						
1962	122	66	.54	62	3,073	5.0
1963	433	237	.55	78	3,907	5.0
1964	309	158	.51	-	-	-

(a) Prior to 1962 included in s.c. 8870; beginning in 1964 renumbered as s.c. 424-21

Table 17

Imports: Vinyl chloride film and sheet, s.c. 8724^(a)

Tariff Items 660a, 905(d)1, 905(d)2 and 906(c)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1962	4,040	2,162	.54	2,147	422,201	19.7
1963	8,225	3,941	.48	3,933	735,079	18.7
1964	6,085	3,124	.51	3,101	532,190	17.2
<u>2. United Kingdom</u>						
1962	275	212	.77	202	26,034	12.9
1963	265	206	.78	203	32,485	16.0
1964	368	247	.67	245	36,445	14.9
<u>3. United States</u>						
1962	2,899	1,579	.54	1,574	328,747	20.9
1963	6,151	3,082	.50	3,077	592,950	19.3
1964	3,805	2,179	.57	2,159	378,256	17.5

(a) Prior to 1962 included in s.c. 8670, 8870; beginning in 1964 renumbered as s.c. 424-24

Table 18

Imports: Vinyl butyral film and sheet, s.c. 8725^(a)

Tariff Item 805

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	<u>Value</u>
				(000)		
<u>1. Total</u>						
1953	..	1,178	-	-	-	-
1954	..	664	-	-	-	-
1955	..	1,244	-	-	-	-
1956	..	1,206	-	-	-	-
1957	..	1,065	-	-	-	-
1958	..	944	-	-	-	-
1959	..	1,107	-	-	-	-
1960	..	880	-	-	-	-
1961	..	1,003	-	-	-	-
1962	963	1,418	1.47	1	76	8.0
1963	1,024	1,524	1.49	-	-	-
1964	1,161	1,709	1.47	-	-	-
<u>2. United States</u>						
1953	..	1,178	-	-	-	-
1954	..	664	-	-	-	-
1955	..	1,244	-	-	-	-
1956	..	1,206	-	-	-	-
1957	..	1,065	-	-	-	-
1958	..	944	-	-	-	-
1959	..	1,107	-	-	-	-
1960	..	880	-	-	-	-
1961	..	1,003	-	-	-	-
1962	963	1,418	1.47	1	76	8.0
1963	1,024	1,524	1.49	-	-	-
1964	1,161	1,709	1.47	-	-	-

(a) Prior to 1962 was s.c. 9215, "Adhesives for cementing glass sheets, for the manufacture of safety laminated glass"; beginning in 1964 renumbered as s.c. 424-25

Table 19

Imports: Vinyl film and sheet, n.o.p., s.c. 8729^(a)

Tariff Items 660a, 905(d)1, 905(d)2, 905(e)1, 905(e)2, 906(c) and 906(d)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1962	5,399	3,721	.69	2,982	530,005	17.8
1963	4,278	2,748	.64	2,170	393,753	18.1
1964	5,231	3,336	.64	2,550	450,754	17.7
<u>2. United Kingdom</u>						
1962	133	86	.65	82	9,191	11.2
1963	98	81	.82	78	12,771	16.3
1964	117	98	.84	98	14,720	15.0
<u>3. United States</u>						
1962	4,767	3,454	.72	2,723	488,436	17.9
1963	3,964	2,589	.65	2,014	366,863	18.2
1964	4,608	3,073	.67	2,287	408,147	17.8

(a) Prior to 1962 included in s.c. 8670, 8870; beginning in 1964 renumbered as s.c. 424-29

Table 20

Imports: Floor and wall tiles, asphalt, s.c. 7311^(a)

Tariff Item 711

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>sq. ft.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/sq. ft	\$ (000)	\$	
<u>1. Total</u>						
1953	2,233	217	.10	217	43,405	20.0
1954	759	83	.11	83	16,538	19.9
1955	2,351	204	.09	204	40,142	19.7
1956	2,412	267	.11	267	53,405	20.0
1957	966	92	.10	92	18,374	20.0
1958	962	102	.11	101	20,216	20.0
1959	983	93	.10	93	18,697	20.0
1960	627	66	.11	66	13,283	20.0
1961	971	97	.10	97	19,368	20.0
1962	541	59	.11	59	12,951	21.8
1963	122	14	.12	14	2,850	20.2
1964	71	6	.09	6	1,248	19.9
<u>2. United Kingdom</u>						
1953	-	-	-	-	-	-
1954	17	2	.11	2	268	15.0
1955	107	12	.11	12	1,769	15.0
1956-64	-	-	-	-	-	-
<u>3. United States</u>						
1953	2,233	217	.10	217	43,405	20.0
1954	742	81	.11	81	16,270	20.0
1955	2,244	192	.09	192	38,373	20.0
1956	2,412	267	.11	267	53,405	20.0
1957	966	92	.10	92	18,374	20.0
1958	962	101	.11	101	20,216	20.0
1959	983	93	.10	93	18,697	20.0
1960	627	66	.11	66	13,283	20.0
1961	971	97	.10	97	19,368	20.0
1962	541	59	.11	59	12,951	21.8
1963	122	14	.12	14	2,850	20.2
1964	71	6	.09	6	1,248	19.9

(a) Prior to 1961, was s.c. 7303; beginning in 1964 renumbered as s.c. 494-40

Table 21

Imports: Floor and wall tiles, vinyl or vinyl-asbestos,
s.c. 7310(a)

Tariff Items 711 and 908

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	sq. ft.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/sq. ft.	\$	\$	Dutiable
				(000)		Value
<u>1. Total</u>						
1961	5,254	884	.17	884	171,398	19.4
1962	4,446	726	.16	726	161,503	22.2
1963	4,592	725	.16	725	146,331	20.2
1964	3,369	336	.10	336	54,796	16.3
<u>2. United Kingdom</u>						
1961	646	112	.17	112	16,767	15.0
1962	2,042	202	.10	202	36,588	18.1
1963	2,672	251	.09	251	40,960	16.3
1964	2,577	238	.09	238	35,637	15.0
<u>3. United States</u>						
1961	1,919	498	.26	498	99,859	20.0
1962	1,474	414	.28	414	98,928	23.9
1963	1,254	412	.33	412	91,997	22.3
1964	430	65	.15	65	12,928	19.7
<u>4. Belgium & Luxembourg</u>						
1961	1,600	138	.09	138	27,602	20.0
1962	551	47	.09	47	10,738	22.8
1963	519	44	.08	44	8,503	19.5
1964	297	27	.09	27	5,196	19.5

(a) Prior to 1961, included in s.c. 8950; beginning in 1964 renumbered as s.c. 494-44; also included in s.c. 425-99 and 494-49

Table 22

Imports: Floor and wall tiles, n.o.p., except ceramic, metal or wood,
s.c. 7312(a)

Tariff Item 908

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	sq. ft. (000)	\$ (000)	Value \$/sq. ft.	Value \$ (000)	Collected \$	p.c. of Dutiable Value
<u>1. Total</u>						
1961	1,743	395	.23	395	77,994	19.8
1962	1,495	371	.25	371	87,187	23.5
1963	993	298	.30	298	60,378	20.3
1964	3,603	622	.17	620	116,769	18.8
<u>2. United Kingdom</u>						
1961	115	13	.11	13	1,915	15.0
1962	4	*	.11	*	61	15.1
1963	86	24	.27	24	3,501	14.8
1964	945	111	.12	109	15,759	14.5
<u>3. United States</u>						
1961	1,548	364	.24	364	72,910	20.0
1962	1,491	370	.25	370	87,097	23.5
1963	716	182	.25	182	40,835	22.4
1964	1,666	400	.24	400	78,863	19.7
<u>4. Italy</u>						
1961	46	14	.31	14	2,555	17.8
1962	*	*	.34	*	29	17.6
1963	183	89	.49	89	15,523	17.4
1964	13	8	.60	8	1,573	20.2

(a) Prior to 1961 included in s.c. 1726, 3485, 8900 and 8950; beginning in 1964 renumbered as s.c. 494-49, "Floor and wall tiles n.e.s.", which includes part of s.c. 7310; also included in s.c. 425-99, "Plastics fabricated materials n.e.s."

Table 23

Imports: Foamed and expanded synthetic resins in logs, sheets, blocks, boards, flakes, granules or powder, s.c. 8830^(a)

Tariff Item 907

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	224	-	-	-
1954	347	-	-	-
1955	648	-	-	-
1956	605	-	-	-
1957 ^(b)	928	-	-	-
1958	1,736	901	180,164	20.0
1959	967	967	193,413	20.0
1960	1,000	1,000	200,136	20.0
1961	1,530	1,524	304,736	20.0

2. United Kingdom

1953	1	-	-	-
1954	2	-	-	-
1955	3	-	-	-
1956	1	-	-	-
1957	*	-	-	-
1958	*	*	12	15.4
1959	*	*	28	15.1
1960	*	*	11	14.9
1961	3	3	393	14.9

3. United States

1953	223	-	-	-
1954	333	-	-	-
1955	403	-	-	-
1956	485	-	-	-
1957	722	-	-	-
1958	1,577	815	162,975	20.0
1959	822	822	164,377	20.0
1960	873	873	174,657	20.0
1961	1,412	1,407	281,352	20.0

^(a) Beginning in 1962 included in s.c. 8619, 8649, and 8831

^(b) Prior to 1958 "Foamed and expanded synthetic resins in logs, blocks, boards, flakes, granules or powder"

Table 24

Imports: Reinforced or supported synthetic resin plates, sheets, strip, tubing, blocks, bars, rods in which is incorporated a layer of paper, fibreboard or textile fabric, or a core of fibres whether matted or otherwise arranged, n.o.p., s.c. 8900(a)

Tariff Item 917(b)

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	900	895	134,286	15.0
1954	1,122	1,122	168,249	15.0
1955	1,610	1,609	241,388	15.0
1956	1,538	1,538	230,747	15.0
1957	1,964	1,506	225,936	15.0
1958	2,209	1,751	262,725	15.0
1959	3,266	2,762	415,748	15.1
1960	3,660	3,167	478,415	15.1
1961	3,487	2,896	439,551	15.2
<u>2. United Kingdom</u>				
1953	-	-	-	-
1954	1	1	224	15.0
1955	11	11	1,577	15.0
1956	3	3	401	15.0
1957	77	4	556	15.0
1958	91	18	2,757	15.0
1959	124	15	2,053	13.4
1960	133	15	2,222	15.0
1961	131	13	1,911	15.0
<u>3. United States</u>				
1953	900	895	134,286	15.0
1954	1,120	1,120	168,025	15.0
1955	1,597	1,596	239,456	15.0
1956	1,529	1,529	229,307	15.0
1957	1,883	1,498	224,649	15.0
1958	2,114	1,729	259,393	15.0
1959	3,128	2,733	411,676	15.1
1960	3,485	3,110	469,987	15.1
1961	3,331	2,861	434,211	15.2

(a) Beginning in 1962 included in s.c. 8855 and 8899

Table 25

Imports: Laminated moulded plastic products having synthetic resins
as the chief bonding agents, s.c. 8930^(a)

Tariff Item 916

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	492	492	73,734	15.0
1954	551	551	82,715	15.0
1955	528	528	79,136	15.0
1956	722	722	108,241	15.0
1957	856	854	128,124	15.0
1958	789	781	117,180	15.0
1959	985	984	147,782	15.0
1960	1,205	1,199	179,989	15.0
1961	1,247	1,243	186,615	15.0
<u>2. United Kingdom</u>				
1953	115	115	17,264	15.0
1954	136	136	20,437	15.0
1955	33	33	4,925	15.0
1956	67	67	10,030	15.0
1957	49	49	7,304	15.0
1958	28	28	4,245	15.0
1959	101	101	15,102	15.0
1960	80	78	11,771	15.0
1961	132	132	19,804	15.0
<u>3. United States</u>				
1953	377	376	56,470	15.0
1954	415	415	62,278	15.0
1955	495	495	74,211	15.0
1956	652	652	97,859	15.0
1957	807	805	120,820	15.0
1958	757	749	112,376	15.0
1959	880	880	132,074	15.0
1960	1,124	1,119	167,974	15.0
1961	1,105	1,101	165,343	15.0

(a) Beginning in 1962 included in s.c. 8840 and 8849

Table 1

Exports of Synthetic Resins and Plastics Materials
of B.T.N. Chapter 39, 1962-64

	1962		1963		1964	
	'000 lb.	\$'000	'000 lb.	\$'000	'000 lb.	\$'000
Polyethylene resins, not shaped	35,534	6,701	38,964	6,327	54,857	9,109
Polystyrene resins, not shaped	21,715	3,571	30,394	4,269	27,385	3,781
Plastics scrap and waste	5,947	411	5,785	354	6,913	438
Plastic film and sheet	10,618	5,587	11,264	6,755	12,640	7,846
Laminated plastics materials	2,633	1,402	2,572	1,222	3,400	1,616
Plastics basic shapes and forms n.e.s.	..	1,515	12,742	2,449	..	3,534
Plastic end products, n.e.s.	..	254	..	390	..	409
Sub-total		19,441		21,766		26,733
Synthetic and reclaimed rubber and plastics materials, not shaped, n.e.s. (a)	..	73,888	..	77,456	..	85,395
Total of above		93,329		99,222		112,128

(a) The majority of these exports would be synthetic and reclaimed rubber

Source: D.B.S., Trade of Canada, Exports

Table 2

Exports: Polyethylene (polythene) resins, not shaped, s.c. 424-16^(a)

<u>Year</u>	<u>Quantity</u> cwt.	<u>Value</u> \$	Unit <u>Value</u> \$/cwt.
1962	355,343	6,701,184	18.86
1963	389,643	6,327,317	16.24
1964	548,574	9,109,061	16.60
1965	361,363	5,900,703	16.33

(a) Not available prior to 1962

Table 3

Exports: Polystyrene, s.c. 8470^(a)

<u>Year</u>	<u>Quantity</u> cwt.	<u>Value</u> \$	Unit <u>Value</u> \$/cwt.
1953	254,253	7,378,571	29.02
1954	245,793	7,488,917	30.47
1955	227,408	7,009,108	30.82
1956	211,044	6,174,136	29.26
1957	242,570	6,845,502	28.22
1958	269,519	7,405,673	27.48
1959	339,033	8,382,237	24.72
1960	354,556	7,583,492	21.39
1961	276,277	5,236,385	18.95
1962	217,147	3,571,448	16.45
1963	303,937	4,269,388	14.05
1964	273,851	3,780,733	13.81
1965	207,322	3,015,150	14.54

(a) Beginning in 1961 renumbered as s.c. 424-18, "Polystyrene resins, not shaped"

Table 4

Exports: Plastic film and sheet, s.c. 8472^(a)

<u>Year</u>	<u>Quantity</u> cwt.	<u>Value</u> \$	<u>Unit</u> <u>Value</u> \$/cwt.
1960	..	3,650,035	..
1961	..	3,870,737	..
1962	106,181	5,586,593	52.61
1963	112,644	6,775,315	60.15
1964	126,398	7,845,980	62.07
1965	132,104	7,353,603	55.67

(a) Not available prior to 1960. Beginning in 1961 renumbered as s.c. 425-09

Table 5

Exports: Plastics basic shapes and forms n.e.s., s.c. 8473^(a)

<u>Year</u>	<u>Value</u> \$
1960	1,489,632
1961	3,577,023
1962	1,514,676
1963	2,448,987
1964	3,533,858
1965	4,539,384

(a) Not available prior to 1960. Beginning in 1961 renumbered as s.c. 425-99

Table 6

Exports: Plastics scrap and waste, s.c. 424-89^(a)

<u>Year</u>	<u>Quantity</u> cwt.	<u>Value</u> \$	<u>Unit</u> <u>Value</u> \$/cwt.
1962	59,465	410,706	6.91
1963	57,849	353,668	6.11
1964	69,125	437,674	6.33
1965	66,864	442,334	6.62

(a) Not available prior to 1962

Table 7

Exports: Laminated plastics materials, s.c. 425-49^(a)

<u>Year</u>	<u>Quantity</u> cwt.	<u>Value</u> \$	<u>Unit</u> <u>Value</u> \$/cwt.
1962	26,325	1,401,508	53.24
1963	25,723	1,222,321	47.52
1964	34,003	1,616,340	47.54
1965	21,758	1,004,062	46.15

(a) Not available prior to 1962

Table 8

Exports: Synthetic resins, manufactures of, s.c. 8457^(a)

<u>Year</u>	<u>Value</u> \$
1953	736,084
1954	804,754
1955	1,221,603
1956	1,581,456
1957	2,516,811
1958	2,376,932
1959	4,393,635
1960	1,569,505

(a) Included classes 8472 and 8473 prior to 1960

Table 9

Exports: Plastic end products, n.e.s., s.c. 960-96^(a)

<u>Year</u>	<u>Value</u> \$
1961	295,505
1962	254,473
1963	389,806
1964	408,529
1965	212,911

(a) Not available prior to 1961

APPENDIX IIPrincipal Relevant Recommended Items

	<u>Goods Subject to Duty and Free Goods</u>	<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
R-22	326d - Beads, drops or other shapes of cellulose acetate, glass or synthetic resins, for use exclusively in the manufacture of imitation pearls	Free	Free	Free
R-23	326f - Moulded illuminating shades, reflectors and refractors of glass, of a class or kind not made in Canada, designed for use with light fixtures or with portable lamps	Free	15	32½
R-30	658b - Magnetic recording tape, n.o.p., manufactured from synthetic resins or cellulose plastics:			
	(1) Unrecorded	5	10	25
	(2) Recorded	15	20	25
R-39	Synthetic wax; waxes containing synthetic wax:			
	(1) Other than the following	15	15	25
	(2) Polyethylene of a weight-average molecular weight not exceeding 5000	Free	Free	10
39.01	Condensation, polycondensation and polyaddition products, whether or not modified or polymerised, and whether or not linear (for example, phenoplasts, aminoplasts, alkyds, polyallyl esters and other unsaturated polyesters, silicones):			
	(a) Without admixture other than an agent necessary to prevent caking, including scrap and waste; aqueous emulsions, aqueous dispersions or aqueous solutions, without other admixture:			
	1. Other than the following types	Free	Free	10
	2. Alkyd type	10	10	20
	3. Epoxy type	10	10	20
	4. Melamine formaldehyde type	10	10	20
	5. Phenol formaldehyde type	10	10	20
	6. Polyamide epichlorohydrin type	7½	7½	20
	7. Polyamide type, other than enumerated in this paragraph (a)	10	10	20

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
39.01	(a) (Cont'd)			
(Cont'd)	8. Polycaprolactam type	7½	7½	20
	9. Polyether type	10	10	20
	10. Polyethylene terephthalate type	10	10	20
	11. Unsaturated polyester type	10	10	20
	12. Urea formaldehyde type	7½	7½	20
	(b) In organic solvents, where the weight of the solvent does not exceed 50 per cent of the weight of the solution, without other admixture:			
	1. Other than the following types	7½	7½	20
	2. Alkyd type	12½	12½	25
	3. Epoxy type	12½	12½	25
	4. Melamine formaldehyde type	12½	12½	25
	5. Phenol formaldehyde type	12½	12½	25
	6. Polyamide type	12½	12½	25
	7. Polyethylene terephthalate type	12½	12½	25
	8. Unsaturated polyester type	12½	12½	25
	9. Urea formaldehyde type	10	10	20
	(c) Moulding compositions, n.o.p., including scrap or waste, whether or not completely formulated; such compositions in the form of not fully cured preforms for compression moulding:			
	1. Other than the following types	Free	Free	10
	2. Epoxy type	12½	12½	25
	3. Melamine formaldehyde type	12½	12½	25
	4. Phenol formaldehyde type	12½	12½	25
	5. Polyamide type	12½	12½	25
	6. Polyurethane type	7½	7½	25
	7. Silicones	7½	7½	25
	8. Unsaturated polyester type	12½	12½	25
	9. Urea formaldehyde type	10	10	25
	(d) Compositions, n.o.p., composed entirely or predominantly of the condensation, polycondensation and polyaddition materials of paragraph (a) of this item	15	15	25
	(e) Admixed with other materials to form glues or adhesives packaged or in bulk	15	17½	25
	(f) Foamed and expanded, in logs, sheets, blocks, boards, flakes, granules, powder, shreds, scrap or waste	15	15	25

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
39.01 (Cont'd)	(g) Plates, sheets, film, sheeting, strip; lay-flat or other tubing, blocks, bars, rods, sticks, non-textile monofilament and other profile shapes imported in lengths, all produced in uniform cross-section:			
	1. Other than the following types	Free	Free	10
	2. Epoxy type	17½	17½	25
	3. Melamine formaldehyde type	17½	17½	25
	4. Phenol formaldehyde type	17½	17½	25
	5. Polyamide type	17½	17½	25
	6. Unsaturated polyester type	17½	17½	25
	7. Urea formaldehyde type	17½	17½	25
39.02	Polymerisation and copolymerisation products (for example, polyethylene, polytetrahaloethylenes, polyisobutylene, polystyrene, polyvinyl chloride, polyvinyl acetate, polyvinyl chloroacetate and other polyvinyl derivatives, polyacrylic and polymethacrylic derivatives, coumarone-indene resins):			
	(a) Without admixture other than an agent necessary to prevent caking, including scrap and waste; aqueous emulsions, aqueous dispersions or aqueous solutions, without other admixture:			
	1. Other than the following types	Free	Free	10
	2. Acrylonitrile-butadiene-styrene (ABS) type	10	10	20
	3. Polyacrylic type, including polymethacrylic, emulsions or dispersions	7½	7½	20
	4. Polyethylene type	7½	7½	20
	5. Polypropylene type	7½	7½	20
	6. Polystyrene type	10	10	20
	7. Polyvinyl acetate type	10	10	20
	8. Polyvinyl chloride type, including polyvinyl chloroacetate	10	10	20
	9. Styrene-acrylonitrile type	10	10	20
	(b) In organic solvents, where the weight of the solvent does not exceed 50 per cent of the weight of the solution, without other admixture:			
	1. Other than the following types	7½	7½	20
	2. Polystyrene type	12½	12½	25
	3. Polyvinyl acetate type	12½	12½	25
	4. Polyvinyl chloride type, including polyvinyl chloroacetate	12½	12½	25

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
39.02 (Cont'd)	(c) Moulding compositions, n.o.p., including scrap or waste, whether or not completely formulated; such compositions in the form of not fully cured preforms for compression moulding:			
	1. Other than the following types	Free	Free	10
	2. Acrylonitrile-butadiene-styrene (ABS) type	12 $\frac{1}{2}$	12 $\frac{1}{2}$	25
	3. Polyethylene type	10	10	20
	4. Polypropylene type	10	10	20
	5. Polystyrene type	12 $\frac{1}{2}$	12 $\frac{1}{2}$	25
	6. Polyvinyl acetate type	12 $\frac{1}{2}$	12 $\frac{1}{2}$	25
	7. Polyvinyl chloride type, including polyvinyl chloroacetate	12 $\frac{1}{2}$	12 $\frac{1}{2}$	25
	8. Styrene acrylonitrile type	12 $\frac{1}{2}$	12 $\frac{1}{2}$	25
	(d) Compositions, n.o.p., composed entirely or predominantly of the polymerisation and copolymerisation materials of paragraph (a) of this item	15	15	25
	(e) Admixed with other materials to form glues or adhesives packaged or in bulk	15	17 $\frac{1}{2}$	25
	(f) Foamed and expanded, in logs, sheets, blocks, boards, flakes, granules, powder, shreds, scrap or waste	15	15	25
	(g) Plates, sheets, film, sheeting, strip; lay-flat or other tubing, blocks, bars, rods, sticks, non-textile monofilament and other profile shapes imported in lengths, all produced in uniform cross-section:			
	1. Other than the following types	Free	Free	10
	2. Acrylonitrile-butadiene-styrene (ABS) type	17 $\frac{1}{2}$	17 $\frac{1}{2}$	25
	3. Polyethylene type	15	15	25
	4. Polymethyl methacrylate type plates, sheets, film, sheeting and strip	10	10	20
	5. Polypropylene type	15	15	25
	6. Polystyrene type	17 $\frac{1}{2}$	17 $\frac{1}{2}$	25
	7. Polyvinyl chloride type (including polyvinyl chloroacetate) plates, sheets, film, sheeting, strip, lay-flat or other tubing, other than plain, uncoated, undecorated	17 $\frac{1}{2}$	20	25

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
39.02	(g) (Cont'd)			
(Cont'd)	8. Polyvinyl chloride type (including polyvinyl chloroacetate), other	17 $\frac{1}{2}$	17 $\frac{1}{2}$	25
	9. Styrene-acrylonitrile type	17 $\frac{1}{2}$	17 $\frac{1}{2}$	25

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CANADA

Report by
THE TARIFF BOARD

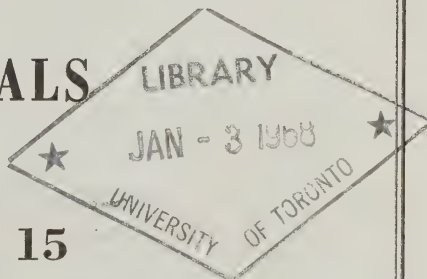
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respecting

CHEMICALS

•
VOLUME 15

**ARTIFICIAL RESINS AND PLASTICS IN HEADINGS
39.03 TO 39.07
OF THE BRUSSELS TARIFF NOMENCLATURE;
OTHER PORTIONS OF THE REFERENCE**

•
Reference No. 120





Report by

THE TARIFF BOARD

Relative to the Inquiry Ordered
by the Minister of Finance
respecting

CHEMICALS



VOLUME 15

ARTIFICIAL RESINS AND PLASTICS IN HEADINGS
39.03 TO 39.07
OF THE BRUSSELS TARIFF NOMENCLATURE;
OTHER PORTIONS OF THE REFERENCE



Reference No. 120

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(39.07 & Other Portions of Ref. 120)

The Honourable Mitchell Sharp, P.C., M.P.,
Minister of Finance,
Ottawa, Ontario.

Dear Mr. Sharp:

I refer to Mr. Harris' letter of September 21, 1956 and to Mr. Fleming's letters of October 11, 1957 and December 21, 1959 in which the Tariff Board was requested to conduct an inquiry respecting chemicals.

In conformity with Section 6 of the Tariff Board Act, I have the honour to transmit Volume 15 of the Report of the Board, in English and in French. This volume contains the report on artificial resins and plastics in Headings 39.03 to 39.07 of the Brussels Tariff Nomenclature and other portions of Reference 120.

Yours sincerely,

A handwritten signature in dark ink, appearing to read "J.C. Audette", with a long, sweeping horizontal flourish extending to the right.

Chairman

Explanation of Symbols Used

- Denotes zero or none reported
- .. Indicates that figures are not available
- * In statistical tables, indicates a reported figure which disappears on rounding, or is negligible
- (a) A small letter in brackets denotes a footnote to a table
- (1) A number in brackets denotes a footnote to the text
- s.c. Denotes a Dominion Bureau of Statistics import or export statistical class

The sum of the figures in a table may differ from the total, owing to rounding

A Note on the Organization of the Report - Reference 120

The first four volumes of the Report by the Tariff Board respecting Reference 120, Chemicals, relate to the Reference as a whole; the eleven volumes which follow (Volumes 5 to 15, inclusive) relate to the products which were the subject of the Board's inquiry. The principal subject matter of each of the volumes is given below in terms of the headings of the Brussels Tariff Nomenclature (B.T.N.). Occasionally, chemicals of different B.T.N. headings are dealt with together, for example, chlorine (28.01) and caustic soda (28.17); the more detailed tables of contents of the individual volumes indicate where this occurs.

To the extent that particular statistical tables could be related to specific products or B.T.N. headings they are included in the statistical appendix of the volume which deals with that product or heading. Some tables, which could be related only to broader groupings of chemicals, are included in the statistical appendix to the last volume dealing with such broader groupings: inorganic chemicals in Volume 7, organic chemicals in Volume 9 and artificial resins and plastics in Volume 15.

Because of the unprecedented amplitude and complexity of Reference 120 - Chemicals, many parts of Volumes 5 to 15 were written a considerable time before the first four volumes. This gives rise, occasionally, to apparent discrepancies, attributable to the passage of time, particularly between Volume 4 and those which follow.

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4	General Considerations; Summary and Conclusions

Reports on Products

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General Description

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* The numbers shown after product designations are those used in the Brussels Tariff Nomenclature.

REGENERATED CELLULOSE; CELLULOSE NITRATE, CELLULOSE ACETATE AND
OTHER CELLULOSE ESTERS, CELLULOSE ETHERS AND OTHER CHEMICAL
DERIVATIVES OF CELLULOSE, PLASTICISED OR NOT (FOR EXAMPLE,
COLLODIONS, CELLULOID); VULCANISED FIBRE - B.T.N. 39.03

INTRODUCTION

Heading 39.03 includes regenerated cellulose, chemical derivatives of cellulose such as cellulose acetate and cellulose nitrate, cellulose esters, cellulose ethers and vulcanised fibre. All these materials have some commercial significance in Canada; regenerated cellulose, cellulose acetate and cellulose nitrate are of greatest commercial importance.

Total production of the materials of heading 39.03 in Canada has a value in excess of \$50 million, much of which is used in further production by the companies. Imports of products of this heading appear to have a value of about \$11 million; exports exceed imports by a significant amount.

Products under this heading that were brought to the Board's attention are dealt with individually with the exception of vulcanised fibre. This material, which is included in 39.03 in the Brussels classification, is imported chiefly under tariff item 509, and to some extent under 438b and 4450(1) of the Canadian Tariff. These items are not within Reference 120; however, the Industry Committee recommended that the tariff provision for vulcanised fibre, at rates of $17\frac{1}{2}$ p.c., B.P. and M.F.N., as provided by item 509, be located within heading 39.03 in order to preserve the entirety of the meaning of this heading.

Vulcanized fibre is a rigid material produced by treating cellulosic material with zinc chloride. It is used to make a variety of articles such as luggage and parts for electrical equipment and machinery. There appears to be no production of vulcanised fibre in Canada.

Minnesota Mining and Manufacturing of Canada Limited, in its submission on various headings of chapter 39, proposed that the vulcanised fibre at present imported under tariff item 509 be included in B.T.N. 39.03. The company further stated:

"We are large consumers of this material in large mill rolls and we feel that a lower rate of duty should apply to this primary form as opposed to items manufactured from vulcanized fibre. Under item 509 both primary and secondary forms of fibre are imported at the same rate of duty."(1)

REGENERATED CELLULOSE

Regenerated cellulose is a high molecular weight carbohydrate obtained from natural products such as wood-pulp or cotton. It is used in the manufacture of film, meat and food casings, fibre for textiles and other purposes.

(1) Transcript, Vol. 162, p. 24089

Regenerated Cellulose Film

This film, commonly known as cellophane, is manufactured from wood-pulp. The material is glossy, transparent, tough and flexible, odour and grease resistant and impermeable to gases. The production process involves the treatment of highly purified cellulose pulp with sodium hydroxide and carbon disulphide to make sodium cellulose xanthate. The xanthate is then dissolved in a caustic solution to form viscose which, after purification and ripening, is extruded through a metal slit into an acid bath where the cellulose is regenerated as a continuous film. The film is washed and bleached and may be further treated with plasticizers, resins and waxes to meet such requirements as moisture proof and heat sealing.

In Canada, regenerated cellulose film is produced in four principal thicknesses and in a number of different grades. Most of the film is used for food packaging, the second largest application being wrappers for cigarette packages.⁽¹⁾ The film is readily printed or decorated and may also be laminated onto other materials such as paper or foil.

The Industry

There are two manufacturers of regenerated cellulose film in Canada. Production was initiated in 1932 by Canadian Industries Limited (the film manufacturing unit later became part of Du Pont of Canada Limited) at its plant in Shawinigan, Quebec. TCF of Canada Limited, a subsidiary of British Cellophane Limited, itself is jointly owned by Courtaulds Limited (U.K.) and La Cellophane S.E. (France), came into operation in 1953 with a plant situated at Cornwall, Ont.

Du Pont of Canada produces its own requirements of viscose solution to make regenerated cellulose film, and TCF obtains its viscose supplies from Courtaulds (Canada) Ltd. also at Cornwall, Ont. This material, the Board was informed, is unstable and cannot readily be shipped or stored.

The Canadian cellulose film producers were estimated to have consumed close to 19,000 tons of high quality wood-pulp in 1962 costing over \$3 million which was converted to film valued at nearly \$27 million.⁽²⁾ The basic raw material, wood-pulp, is a domestic product as are most of the thirty chemicals used in the production of regenerated cellulose. The cost of the chemicals, which accounts for over 60 per cent of total raw material costs, was said to be about 10 per cent higher in Canada than in the U.S.A.

Du Pont's plant capacity has been estimated to be about 45 million pounds per year.⁽³⁾ The company informed the Board that the U.S. plants range from the same size to three times as large. The facilities required to manufacture regenerated cellulose film are

(1) Transcript. Vol. 158, p. 23456

(2) Same, Vol. 158, p. 23468

(3) Chemical Week, April 24, 1965, p. 108

highly automated and capital intensive. The annual plant capacity of TCF of Canada Limited has been reported as being 15 million pounds. A further expansion to increase the plant capacity by 5 million pounds per annum was announced in April 1965.⁽¹⁾ It would thus appear that total domestic capacity will be in excess of 60 million pounds, a level considerably higher than domestic consumption which, it has been estimated, will reach 40 million pounds by 1970.⁽²⁾

The Market

Canadian consumption of regenerated cellulose film has had a steady growth since production began in Canada, increasing from about 2 million pounds in 1933 to well over 30 million pounds in 1962. This rate of growth, averaging a compound rate of about 10 per cent per year, was said to have fallen off recently because of the introduction of competing films such as cellulose acetate, rubber hydrochloride, polyolefins, polyester, vinylidenes and vinyls as well as wax papers, kraft, glassine and parchment papers.

About 95 per cent of all cellulose film sold in Canada is used as a wrapping material and approximately 75 per cent of this amount went into food packaging for such products as bread, cakes, biscuits and other types of baked goods, fruits, vegetables and a large variety of other food items. Two-thirds of the domestic market is supplied directly from the manufacturer and the rest is distributed through converters who further process the film into laminated materials with paper and foils. There are about thirty or forty converters in Canada.

About 90 per cent of Canadian requirements were said to be supplied by Du Pont and TCF. TCF informed the Board that since its facilities came into operation in 1953, the company has secured a substantial share of the market for cellulose film and succeeded in becoming established as an important factor in the Canadian packaging industry.

During the public hearings, Canadian production of regenerated cellulose film for 1961 was estimated at about 35 million pounds. Canadian Plastics has estimated production of regenerated cellulose film, tubing and sausage casings at nearly 50 million pounds in the years 1963, 1964 and 1965.

Total imports of regenerated cellulose film in 1962 were reported by one producer to be about 3 million pounds or 9 per cent of the domestic market. The other expressed the view that "the actual share of the total Canadian market for cellulose film currently occupied by imported material is greater than the 9 per cent quoted above."⁽³⁾ D.B.S. published data are as follows:

(1) Transcript, April 24, 1965, p. 108

(2) Same, Vol. 158, p. 23457

(3) Same, Vol. 158, p. 23485

Imports of Regenerated Cellulose Film and Sheet,
1962-64

	1962		1963		1964		
	'000 lb.	\$'000	'000 lb.	\$'000	'000 lb.	\$'000	\$/lb.
U. Kingdom	127	77	62	38	82	51	.62
Netherlands	1,554	839	715	437	689	400	.58
Mexico	-	-	-	-	215	95	.44
U. States	690	424	470	322	613	390	.64
Others	74	42	12	10	4	2	.66
	2,445	1,382	1,259	806	1,602	939	.59

Source: D.B.S., Trade of Canada, Cat. No. 65-007

As the table indicates, imports in recent years have been largely from the Netherlands and the U.S.A. While more than 50 per cent of these appear to have emanated from the Netherlands, the opinion was expressed that the film exported from that country might actually be material of U.S. origin which had been routed to Canada via Holland.

It was suggested, for example, that "Holland is in fact a net importer of film, domestic production is believed to be under 7 million pounds per annum while the market consumes an estimated 10 million pounds per annum." In the view of Canadian producers "the United States industry has directly and indirectly been the major source of competition in this market." (1)

One of the producers, speaking in 1963, had the following view on imports:

"Although it may be argued that substantial volumes are not involved, the past year's experience demonstrates that American exporters can surmount the Canadian tariff wall and under the circumstances it is only logical to expect an increase in foreign shipments to this country." (2)

The D.B.S. data in the above table would, however, suggest that imports rather than increasing declined significantly in 1963 and 1964 from the 1962 volume. The trend is borne out by the following table listing U.S. exports of cellulose film to Canada in the period 1958-64.

(1) Transcript, Vol. 158, p. 23480-2

(2) Same, Vol. 158, p. 23462

U.S. Exports of Regenerated Cellulose to Canada,^(a)
1958- 64

	<u>'000 lb.</u>	<u>U.S. \$'000</u>	<u>U.S. \$/lb.</u>
1958	1,065	687	.64
1959	701	560	.80
1960	2,023	1,191	.59
1961	2,477	1,453	.59
1962	1,873	1,126	.60
1963	777	577	.74
1964	828	628	.76

(a) Regenerated Cellulose, (except rayon) rolls and sheets including printed (s.c. No. 82700)

Source: Department of Commerce, Bureau of the Census, U.S. Exports

A certain amount of the imports, both from the U.S. and other countries, appears to be of grades and categories not made in Canada. About 30,000 pounds of film, for example, were imported in 1962 by Du Pont, and TCF claimed to be responsible for almost all of the imports from the United Kingdom.⁽¹⁾

The limited data available on exports indicate that they are not inconsiderable. Canadian Plastics has estimated them at 2.3 million pounds in 1962, 2.6 million in 1963, with a sharp increase to 4.8 million in 1964.⁽²⁾ One of the manufacturers noted that "Over the years, at one time or another, Canadian cellulose film has been shipped to a total of at least 40 countries. In 1962...export sales accounted for a not insignificant proportion of total output and were made to a total of 35 countries."⁽³⁾

Pricing Policy and Prices

Prices in Canada are not published; they were said to be on a delivered basis and subject to varying quantity and trade discounts and allowances. The price of general purpose film in Canada was represented as being 71 cents per pound as compared with a laid-down price of U.S. imports of 80.4 cents per pound. The Board was informed by one producer that "Canadian prices take advantage of only one-third of the protection afforded."⁽⁴⁾

The price of cellulose film in Canada was reported to have been reduced by 8 per cent since the domestic product came on the market in 1933, in contrast with a rise of 122 per cent in the consumer price index during the same period. Prices since 1945 were said to have risen less than wholesale prices; some newer, competitive films, such as polyethylene, however, have experienced price declines in the post-war years.

(1) Transcript, Vol. 158, p. 23505, 23511

(2) Canadian Plastics, Feb. 1964, p. 36; Feb. 1965, p. 25

(3) Transcript, Vol. 158, p. 23459

(4) Same, Vol. 158, p. 23468

The average value of imports of regenerated cellulose film in 1964 was 59 cents per pound. It was 58 cents per pound for imports from the Netherlands and 64 cents per pound from the U.S.A. One producer stated that "The lowest price of cellulose film, based on incremental costs, offered in this country, is believed to be in the neighbourhood of 50 cents a pound." (1)

In relation to the principal competitive products, cellulose film prices, on a per thousand square inches basis, were said to be a little more than double those of polyethylene, about one-third of the polyester films and one-half of the polyvinylidene film prices.

Regenerated Cellulose Meat and Food Casings

These casings, which are made of a tough, flexible, cellulose film, are used in the commercial cooking of meat products. The material is heat-resistant and highly permeable to moisture and to the smoke particles and vapours used in the smoking of meats. The casings are of two types, cellulose food casings and reinforced cellulose food casings. The latter type is reinforced with a hemp backing to enable it to hold more meat under greater pressure.

Cotton, rather than wood-pulp, is the basic raw material used for making regenerated cellulose casings. The process of manufacture is virtually the same, except that the viscose solution is extruded through an annular nozzle rather than a metal slit into an acid bath; the cellulose is regenerated in tubular form. After washing, softening and drying, the flattened tubing is collected on reels. To make the reinforced food casings, a base stock made of hemp is formed into a tube, coated and impregnated with the viscose solution and then treated to regenerate the cellulose.

Cellulose food casings are produced, in varying lengths, in sizes ranging from just under one inch to about 12 inches in flattened width. The cellulosic raw materials were said to be available in the required grades only from the U.S.A. Other required materials, such as caustic soda, sulphuric acid, carbon bisulphide and the softening agents are purchased from domestic sources.

The major use of small cellulose casings is in the manufacture of "skinless" frankfurters and pork sausages. Large casings are employed for such cooked meats as salami, bologna, turkeys, hams and pork. They serve as a mould during the cooking process; they can remain as a protective package, but are not intended to be an edible product.

The only manufacturer of regenerated cellulose food casings in Canada is the Visking Division of Union Carbide Canada Limited at Lindsay, Ontario where a plant has been in operation since 1949. The company sells a substantial proportion of its production through a firm that prints the casings and supplies them to the meat packing industry. Union Carbide also sells directly to butchers and meat packers. (2)

(1) Transcript, Vol. 158, p. 23471

(2) Transcript, Vol. 159, p. 23596

Although these products are said to be sold from coast to coast, the market was represented as being concentrated, with population, in Ontario and Quebec. Since there is only one manufacturer of cellulose casings in Canada, statistics are not made public. However, the market for casings was said to be increasing in pace with the growth of population and the requirements of the meat industry. The latter appears to be the sole consumer, with the exception of something less than one per cent, in the nature of very fine filter, used in laboratories and hospitals as dialysis tubing. The casings used in the meat industry require a particular degree of porosity which has not been duplicated by other plastics such as polyethylene or polyvinyl chloride film, and the only competition comes from casings made from animal intestines and from certain protein materials formed into a tube shape.

Trade data on these materials are not available. Data for these products are included with imports of other sausage casings (excluding natural) for which imports in 1964 were reported to be 971,000 pounds, valued at \$1.5 million. Imports of cellulose food casings were reported as "significant", coming largely from the U.S.A. with some from Germany, Austria and Spain. The Visking Division has been exporting casings in what is understood to be quantities significant in terms of the company's production.

Prices of regenerated cellulose casings were said to vary according to size and printing requirements. Small casings, in about 55-foot lengths, were priced from approximately \$85 to \$115 per 400 piece carton. The price of large casings varied from about \$20 to approximately \$75 per 1,000 pieces of 10 inches in length.

Tariff Considerations

Regenerated cellulose in its various forms is entered mainly under tariff item 918 and also, for reinforced casings, under item 711.

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
918 (a) Regenerated cellulose, in sheets or strips.....	15 p.c.	20 p.c.
(b) Regenerated cellulose sponges..	15 p.c.	20 p.c.
(c) Manufactures of regenerated cellulose, n.o.p.....	15 p.c.	20 p.c.
711 All goods not enumerated in this schedule as subject to any other rate of duty, and not otherwise declared free of duty, and not being goods the importation whereof is by law prohibited....	15 p.c.	25 p.c.
GATT		20 p.c.

Thus, the rates of duty applicable to regenerated cellulose are 15 p.c., B.P., 20 p.c., M.F.N.

Excluding representations of a general nature, there were three submissions made to the Board concerning regenerated cellulose and regenerated cellulose products. All three recommended the maintenance of the present rates of duty.

Du Pont of Canada Limited proposed that regenerated cellulose film, including that printed or otherwise surface-worked as classified under B.T.N. heading 39.03, be dutiable at 15 p.c., B.P. and 20 p.c., M.F.N.⁽¹⁾

TCF Canada Limited recommended that the present rates of duty applicable to cellulose film be retained unchanged, as follows:

"ITEM 918(a) Regenerated cellulose, in sheets or strips:
B.P. 15 per cent, M.F.N. 20 per cent, Gen. 30
per cent."⁽²⁾

The company also recommended the maintenance of the existing duty rates "on the further manufactured forms e.g. printed film and articles manufactured from film...to the extent to which they are 'manufactures of regenerated cellulose, not otherwise provided for'," dutiable under item 918(c).⁽³⁾ TCF indicated that although it had made its recommendation in terms of the existing tariff item the company would have no objection to the adoption of the Brussels Nomenclature as proposed by the Industry Committee.

Union Carbide Canada Limited, on behalf of its Visking Division which manufactures regenerated cellulose food casings, recommended that these materials, including reinforced food casings be classified under B.T.N. heading 39.03, or under 39.07 when they are further worked than merely cut into rectangles or printed in such a way as to identify them with a particular meat producer, and be dutiable under either heading at 15 p.c., B.P. and 20 p.c., M.F.N.⁽⁴⁾

In a letter to the Board, May 21, 1964, Minnesota Mining and Manufacturing of Canada Limited requested that regenerated cellulose film coated with a pressure-sensitive adhesive, known as "SCOTCH" Brand cellulose tape, falling under B.T.N. 39.03, be dutiable at 15 p.c., B.P. and 20 p.c., M.F.N.

No opposing views were presented to the Board either with respect to films or food casings.

Arguments in Support of Tariff Proposals

The essential argument put forward in support of maintaining the present tariff level on regenerated cellulose film was that domestic production needed protection because of disadvantages of scale,

(1) Transcript, Vol. 158, p. 23455

(2) Same, Vol. 158, p. 23477

(3) Same, Vol. 158, p. 23485

(4) Same, Vol. 159, p. 23578, 23583

compared with U.S. competitors, and the effect of lower labour costs with respect to other foreign manufacturers. Higher raw material costs, 10 per cent over U.S. costs, were mentioned in connection with the chemicals which constitute 60 per cent of total raw material costs. While it was recognized that Canada has the advantage of lower wages and salaries compared to the U.S.A., it was contended that:

"because wages and salaries tend to be a fixed rather than a variable element of cost, this advantage is quickly lost when the scale of operations of foreign plants is above the Canadian level. The larger American plants achieve lower wage and salary costs per unit of output despite the higher rates paid."⁽¹⁾

The same spokesman indicated that the unit costs at the Shawinigan plant of Du Pont were less than those for a comparable facility in the U.S.A. where production was only 10 per cent greater. Such advantages, however, were said to fall off as comparisons were made against larger units.

TCF of Canada Limited emphasized that it was U.S. film that has been the major source of competition but that film from other countries was considered to be a potential threat. The fact that such competition had not yet made itself felt was probably due, it was said, to little idle capacity abroad and also to the fact that the types of film produced outside North America have not been designed for use on the high speed machinery used in Canada and the U.S.A., a situation which was considered to be changing rapidly.

In regard to labour, the following comment was made:

"The major cost advantage enjoyed by the competition outside North America lies in the cost of labour which, in the main European producing countries, ranges between 25 per cent and 55 per cent of the Canadian levels. This advantage makes itself felt not only in the cost of direct labour but in the capital cost of buildings and equipment, repairs and maintenance costs, supervision and management costs, etc. Such advantages could be decisive when it is considered that the cost of wages and salaries in TCF amounts to around 25 per cent of total cost."⁽²⁾

At the same time it was admitted that:

"the Canadian industry does not suffer the disadvantages of smaller scale production, vis-a-vis countries outside North America, to the same extent as do many other industries."⁽³⁾

In regard to classification, reference was made to certain printed regenerated cellulose film included in heading 39.03 but dutiable at present under tariff item 181, an item not in the Board's terms of Reference. Attention was also drawn to item 918(c),

(1) Transcript, Vol. 158, p. 23465

(2) Same, Vol. 158, p. 23483

(3) Same, Vol. 158, p. 23482

"manufactures of regenerated cellulose, n.o.p.," of which the printed or otherwise surface-worked film falls under B.T.N. heading 39.03, and it was recommended that no change be made in the existing rates.

Union Carbide, with respect to regenerated cellulose meat and food casings, stated that the present rates of 15 per cent B.P. and 20 per cent M.F.N. on cellulose food casings are necessary to maintain and develop the expanding Canadian economy and that the manufacture of cellulose food casings in Canada has contributed to the growth of the Canadian economy by creating employment directly and, indirectly, in those industries which supply raw materials and services.

In classifying food casings, the company's spokesman indicated that the different sizes of regenerated cellulose food casings were classified under item 918(c). With respect to reinforced cellulose food casings, it appears that this material has been classified under a variety of items, including 12b, 918(c) and 711. On December 10, 1964, the Tariff Board, in Appeal No. 769, ruled the casings in issue to be properly classified in tariff item 711.

Both types, regenerated cellulose casings and reinforced casings were said by the company spokesman to be properly classified under B.T.N. heading 39.03 whether they are cut to length, rectangular or printed. However, if the name of the meat manufacturer appeared in the printed material which "irrevocably commits the product to a particular manufacturer, or the product is further cut or further worked than merely being put in the rectangular form, then the product becomes a manufacture of regenerated cellulose and falls under 39.07."(1)

It was noted at the hearing that the reinforced casings are classified under B.T.N. heading 39.07 by Italy, while the United Kingdom, Germany, France and the Benelux countries classify them under 39.03.

Analysis of Proposals

The situation at the time of the hearing in 1963 respecting regenerated cellulose film and casings was generally favourable to the domestic producers. A review of the industry indicated steady growth, some price increases from earlier years, significant participation in the export market and limited import competition. The circumstances relating to cellulose film since that time appear to have continued to be favourable. While there was the contention at the public hearing that low-priced imports, facilitated by third country transactions, were a factor of some significance in the domestic cellulose film market, the sharp decline in imports during 1963 and 1964 would suggest that the problem diminished in importance in those years. The reported expansion of Canadian productive capacity would indicate that market prospects are encouraging. The following recent report is of some interest.

(1) Transcript, Vol. 159, p. 23569

"A TCF source says the inroads being made by the polyolefins and shrunk films have run their course and cellulose film is maintaining steady growth. The growing use of saran-coated cellulose film and laminates have also boosted sales."⁽¹⁾

The producers have been operating under tariff protection of 15 p.c., B.P., 20 p.c., M.F.N., and requested that this level of protection be continued. Certain factors of cost were mentioned in which Canadian producers were said to be at a disadvantage compared with producers in other countries. However, scale of operation and general efficiency were regarded by the Canadian manufacturers as comparing favourably with most potential competitors abroad, and it was noted that the Canadian producers, using only part of the tariff protection available to them, had been able to supply at least 90 per cent of Canadian requirements.

CELLULOSE ACETATE

Cellulose acetate is a thermoplastic material made by treating cellulose (wood-pulp or cotton linters) with acetic acid and acetic anhydride, in the presence of a catalyst. The product, in the form of a white flake or powder, is available in two grades, rayon and plastic. It is used principally in the production of synthetic fibre, plastic film and sheeting and moulding powder. By far the largest application of cellulose acetate in Canada is in the manufacture of rayon fibre for textile and other purposes. One of the most active areas of growth in the use of cellulose acetate fibre is in filters for cigarettes. Uses of cellulose acetate also include lacquers, protective coating solutions, photographic film, transparent sheeting for boxes and skin packaging and thermoplastic moulding composition. The moulding material, which consists of cellulose acetate flake further mixed with plasticizers, pigments and dyes, is used in the manufacture of toys, beads, cutlery, screw driver handles, knobs, electrical parts, buttons and housings for small-motored electrical appliances. Plastics made from cellulose acetate are noted for their toughness, high impact strength and stability under normal temperature conditions.

The Industry

Of the two basic grades of cellulose acetate, only cellulose acetate flake, rayon grade, is made in Canada. Production began initially with Canadian Celanese Limited, as part of its acetate fibre manufacturing operations which had begun in 1928 at Drummondville, Que. In 1953, Canadian Chemical Company Limited commenced production of the flake at Edmonton, Alta., and its operation included the production of raw materials such as acetic acid and acetic anhydride. The Edmonton plant obtains the other principal raw material, alpha cellulose, from Columbia Cellulose Company, Limited, another affiliate of Celanese Corporation of America.

In 1963, the two companies, Canadian Celanese Limited and the Canadian Chemical Company Limited, merged to form a new company, known as Chemcell (1963) Limited. The production of the two operations

(1) Chemical Week, April 24, 1965, p. 108

is complementary to the extent that the operation at Edmonton manufactures cellulose acetate flake and some of its principal chemical materials such as acetic acid and acetic anhydride as well as other chemicals including formaldehyde, pentaerythritol and methanol, but does not manufacture cellulose triacetate; Canadian Celanese produces the triacetate and goes beyond acetate fibre to make fabrics and carpets. Capacity of Chemcell's acetate fibre operations has been estimated at about 50 million pounds a year; the flake capacity, therefore, would be considerably larger, principally because of export sales of the flake.⁽¹⁾

Cellulose acetate moulding compounds are manufactured in Canada by Kayson Plastics & Chemicals Limited at Preston, Ontario, from imported plastic grade flake. It would appear that the applications where cellulose acetate moulding compound occupies a preferred position are not numerous and the Board was told that its use has tended to give way to other plastics.⁽²⁾

The Market

Statistical data on the production and shipment of cellulose acetate flake, rayon grade, in Canada are confidential. Captive use, together with exports, account for nearly all the flake produced domestically. Production of moulding compounds was estimated at 200,000 pounds in 1964 and 1965, compared with about 300,000 pounds in 1963.⁽³⁾

Imported cellulose acetate, including flake, compounds, and film and sheet of various types, amounted to about 7 million pounds, valued at approximately \$5 million in 1962 and 1963 and declined somewhat in 1964 to 6.4 million pounds valued at \$4.8 million.

Imports of Cellulose Acetate, 1962-64

	<u>1962</u>		<u>1963</u>		<u>1964</u>	
	'000 lb.	\$'000	'000 lb.	\$'000	'000 lb.	\$'000
Flake and						
Compounds	3,438	1,052	3,563	1,109	2,881	888
Film and Sheet	2,952	2,999	2,751	2,936	2,776	2,751
Photographic						
base film	699	930	816	1,151	776	1,181
TOTAL	7,089	4,981	7,130	5,196	6,433	4,820

Source: D.B.S., Trade of Canada, Imports

(1) Chemical and Engineering News, Dec. 21, 1964, p. 51

(2) Transcript, Vol. 159, p. 23610

(3) Canadian Plastics, Feb. 1965, p. 30; Feb. 1964, p. 42

Imports of cellulose acetate classified as "Flake and Compounds" apparently include material in solvents which are principally used for surface coatings; the extent of these imports is not known. In 1963 and 1964, some 300,000 pounds of imports were estimated to be moulding compounds.(1)

Export data are not publicly available but the Board was told that large quantities of cellulose acetate flake, rayon grade, were exported to more than fifteen countries.(2) Exports would exceed the imports recorded above; most exports are in flake form.

Prices of this material are not published in Canada. Published prices of cellulose acetate flake or powder in the U.S.A., on a delivered basis of truckload quantities, ranged from 36¢ per pound to 44¢ per pound in 1965.(3)

Cellulose Acetate Film and Sheet

Cellulose acetate film is manufactured by both the casting and extrusion method. It has a crystal clarity, wrinkle resistance, water resistance and dimensional stability. The film is used in packaging, laminates, electrical insulations, protective folders and in various other ways.

Sheet is generally manufactured by extrusion and has about the same properties as film. It is used in machine guards, laminates, rigid containers, printed signs and displays, sun shades and curtains, eye-glass frames, handbags and in a variety of other uses.

At the time of the hearing, cellulose acetate film and sheet were not made in Canada. It was reported late in 1965 that C.I.L. planned to extrude cellulose acetate sheet at a new plant, under construction at Nobel, Ontario. It was also reported that Federal Plastics Limited of Montreal, Quebec began extruding the sheet in 1965.(4)

Imports of cellulose acetate film and sheet amounted to about 2.8 million pounds valued at nearly \$2.8 million in 1964. More than 80 per cent of the imports came from the U.S.A. and most of the remainder from the U.K. These imports include such materials as cellulose acetate film and sheet not less than 6 inches in width, sheets less than 6 inches in width, used for the manufacture of spectacle and eye-glass frames and wire-mesh reinforced cellulose acetate film.

Cellulose Acetate Photographic Base Film

This type of film, although basically a plastic sheet, is a highly specialized product which is manufactured to rigid specifications with regard to specific mechanical requirements, cleanliness, thickness uniformity and freedom from defects.(5) Various surface coatings are applied to these films to provide adhesion of the emulsion

(1) Canadian Plastics, February, 1944, p. 43

(2) Transcript, Vol. 159, p. 23606

(3) Oil, Paint and Drug Reporter

(4) Canadian Plastics, February, 1966

(5) Transcript, Vol. 160, p. 23749

and to prevent static discharge which could cause photographic defects.

Cellulose acetate photographic base film is not made in Canada. Imports, all from the U.S.A., in 1964 amounted to about 776,000 pounds valued at \$1,181,000.

Other Products

Various other cellulose acetate products are imported into Canada including items such as cellulose acetate rods, mostly imported for the manufacture of cellulose acetate buttons, amber acetate extruded rod for tool handles and cellulose acetate blocks and shapes for various other uses. Expanded cellulose acetate, known in industry as cellular cellulose acetate, is also imported for use in making floats for indicating devices and in life-floats, buoys and other marine flotation devices. None of these products is separately classified in the import statistics.

Tariff Considerations

Cellulose acetate in its various forms is entered chiefly under the items listed below.

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
909 (a) Esters or ethers, or combinations thereof, of cellulose (but not including water soluble cellulose esters or ethers), without admixture:-		
2. Cellulose acetate	Free	Free
909 (c) Esters or ethers, or combinations thereof, of cellulose, in organic solvents, where the solvent is not more than 60 per cent by weight, without other admixture:-		
2. Cellulose acetate	10 p.c.	10 p.c.
910 Esters or ethers, or combinations thereof, of cellulose compounded with other materials, in any form, including scrap or waste, for moulding, casting, extruding, calendering, pressing, (moulding compositions or materials for processing into moulding compositions)	Free	Free

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
911 Compositions of esters or ethers of cellulose (except water soluble esters or ethers of cellulose) with other materials, n.o.p.	10 p.c.	10 p.c.
912 Cellulose plastics plates, sheets, film, sheeting or strips, not less than 6 inches in width, n.o.p.; cellulose plastics lay-flat tubing, not less than 6 inches in circumference, n.o.p.	Free	Free
913 Cellulose plastics plates, sheets, film, sheeting or strips, less than 6 inches in width, lay-flat tubing less than 6 inches in circumference, other tubing, blocks, bars, rods, non-textile monofilament; cellulose plastics profile shapes produced in uniform cross-section and imported in lengths: not further manufactured than moulded, cast, calendered, extruded or pressed, n.o.p.:- (b) Other	15 p.c.	15 p.c.
914 Foamed and expanded cellulose plastics in sheets, blocks or boards, granules or powder	15 p.c.	20 p.c.
915 Manufactures of cellulose plastics, n.o.p.:- (c) Other	15 p.c.	20 p.c.
917 Reinforced or supported synthetic resin or cellulose plastics plates, sheets, sheeting, strips, tubing, blocks, bars, rods, in which is incorporated a layer of paper, fibreboard, or textile fabric, or a core of fibres whether matted or otherwise arranged, n.o.p.:- (a) Interlined sheet stock, composed of sheets of cellulose plastics cemented to cotton fabric (b) Other	10 p.c. 15 p.c.	15 p.c. 15 p.c.

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
924a Bars, rods and profile shapes of uniform cross-section of cellulose plastic, except cellulose nitrate, when imported in lengths for use in the manufacture of hand tools	10 p.c.	10 p.c.
924c Cellulose plastics plates or sheets, less than 6 inches in width, for use in the manufacture of spectacle and eyeglass frames	Free	Free
822 Sheet cellulose acetate, in rolls, when imported by manufacturers of sensitized photographic film, for use exclusively in the manufacture of sensitized photographic film in their own factories	Free	Free
577 Collars and cuffs manufactured from cellulose plastics with or without cotton interlining	Free	20 p.c.
446f Cellulose acetate film reinforced with wire mesh	Free	25 p.c.
GATT		22 $\frac{1}{2}$ p.c.
326d Beads, drops or other shapes of glass or cellulose acetate, when imported by manufacturers of imitation pearls, for use exclusively in the manufacture of such articles in their own factories	Free	Free

Tariff Proposals

There were nine submissions which made specific reference to cellulose acetate in its various forms. Canadian Chemical Company Limited, a manufacturer of cellulose acetate flake, proposed no change in the present duty-free status of cellulose acetate flake.(1)

All of the other submissions were made by consumers and importers. The British Plastics Federation requested the continuation of duty-free entry under the B.P. Tariff of cellulose acetate flake (item 909(a)2), cellulose acetate moulding powders (item 910),

(1) Transcript, Vol. 159, p. 23607

cellulose acetate film and sheet not less than 6 inches in width (item 912), sheets less than 6 inches in width for the manufacture of spectacle and eye-glass frames (item 924(c)), and wire mesh reinforced cellulose acetate film (item 446(f)). The duty-free status was to continue as long as there is no Canadian manufacture of these materials, or insufficient manufacture to meet a substantial part of the market's requirements. When the products are so made in Canada, it was suggested that the rate of duty should not exceed 15 per cent under the B.P. Tariff.⁽¹⁾ It was also requested that no increase be made in the rates of B.P. duty on items 913(b), 914, 915(c) and 917(b), and that the preferential margins on items 914, 915(c) and 446(f) be retained for as long as Canada's treaty commitments permit. In regard to end-use items, the British Plastics Federation requested that items 924(a) and 924(c) be retained as an integral part of the Canadian tariff structure.

Canadian Buttons Limited requested that duty rates on cellulose acetate plastics rods, entered under tariff item 913(b), remain unchanged and that the present free entry of cellulose acetate moulding granules under item 910 be kept.⁽²⁾

Duplicate Canada Limited and its associate companies, Smith & Stone Ltd. and Plax Canada Ltd., requested that there be no change in the present item 910.⁽³⁾

Gray Forgings and Stampings Limited, manufacturers of screw-drivers, and importers of "six flute Amber Acetate Extruded Rod" (cellulose acetate rod) under item 924a, indicated a preference for "the lowest rate of duty applicable".⁽⁴⁾

Minnesota Mining and Manufacturing of Canada Limited proposed that cellulose acetate film with polished or matte finish be free of duty until such time as it is produced in Canada, and at that time the rates be 15 p.c., B.P. and 20 p.c., M.F.N.⁽⁵⁾

The Canadian Pharmaceutical Manufacturers Association included cellulose acetate in a list of products used by its members for which it proposed end-use treatment with rates of Free, B.P., 15 p.c., M.F.N. for products not made in Canada and of 15 p.c., B.P., 20 p.c., M.F.N. for those made in Canada.⁽⁶⁾

On the matter of cellulose acetate photographic base film, Canadian Kodak Company Limited requested that if the Brussels Nomenclature is adopted, photographic base film, cellulose acetate, be specifically included under B.T.N. 39.03, free of duty until made in Canada.⁽⁷⁾ The company recommended, in effect, that items 905f(1),

(1) Transcript, Vol. 123, p. 18477

(2) Same, Vol. 161, p. 23974

(3) Same, Vol. 159, p. 23702

(4) Same, Vol. 159, p. 23613

(5) Same, Vol. 162, p. 24088

(6) Same, Vol. 87, p. 13304

(7) Same, Vol. 160, p. 23754

822 and 912, which cover the various types of photographic base film, be brought together into one new end-use tariff item, subject to such recommendations as the Board may make concerning the Brussels Nomenclature. In this connection, Kodak indicated that it had requested the Department of Finance, until the Tariff Board makes its recommendations, to establish a single tariff item to cover photographic base film of a class or kind not made in Canada as follows:

	<u>B.P.</u>	<u>M.F.N.</u>
Plain photographic base film, in rolls, to be coated with a silver haloid emulsion, for use in the manufacture of photographic film	Free	Free

AnSCO of Canada Limited asked that if there is to be a single tariff item covering photographic film, it should include sensitized as well as unsensitized film and proposed the following wording:⁽¹⁾

	<u>B.P.</u>	<u>M.F.N.</u>
Photographic film and paper in rolls coated or to be coated with a silver haloid emulsion for use in the manufacture of photographic film and papers by manufacturers in their own factories	Free	Free

The Association of Motion Picture Producers and Laboratories of Canada suggested to the Board that tariff item 915(b), which covers cellulose nitrate films, be updated by either adding the word "acetate" to it or substituting "acetate" for the word "nitrate".⁽²⁾ The present wording of tariff item item 915(b) is archaic, the Association claimed, in that nitrate base stock has been replaced entirely by acetate base stock for the manufacture of motion picture film.

In the B.T.N., sensitized film and exposed film (such as that entered under item 915(b)) is classified in Chapter 37, Photographic and Cinematographic Goods.

Arguments in Support of Tariff Proposals

In the view of the Canadian producer of cellulose acetate flake, the present tariff was not a significant factor in the production of this material because domestic use was essentially all captive to the producers' spinning operation. The cost of production at Edmonton was said to compare favourably with that in the U.S.A.

(1) Transcript, Vol. 160, p. 23778

(2) Same, Vol. 160, p. 23807

because of a "combination of circumstances in Alberta which made it feasible to undertake this type of operation and achieve low cost provided it was done on a large enough scale." (1) In these circumstances, it seems to be unlikely that another company will establish a spinning operation based on imported material.

The British Plastics Federation claimed that hardly any country could produce all its various grades of plastics and, in the long run, a highly protected plastics industry is disadvantageous "because the moulder and fabricator will not be able to obtain the materials available to his equivalent in other countries and will not be able to offer to the consumer an equivalent range of products." (2) The Federation also pointed out that "the United Kingdom industry has to overcome in some cases very high tariffs as well as high transport costs when competing in Canada with the United States plastics industry." (3)

The users of rods and cellulose acetate compounds, such as Canadian Buttons, Duplate Canada Limited and Gray Forgings, would retain the status quo because these materials are not made in Canada and because any increase in duty rates would worsen their competitive position compared to low cost producers in other countries. (4)

In dealing with photographic base film, Canadian Kodak Company Limited stated that this type of film was not made in Canada because the Canadian demand was too small to justify the large capital outlay required for plant and equipment and for the expensive production techniques. The manufacturing operation in Canada is confined to sensitizing the imported base film with silver haloid emulsion. The company, which obtains its photographic base film from the parent company, Eastman Kodak Company of Rochester, New York, U.S.A., indicated that it was the only importer of this product. It was stated that reference to "cellulose nitrate" under item 915(b) is now obsolete because cellulose nitrate base film has not been used in this continent for at least ten years. Item 822, which pertains only to cellulose acetate film, was also mentioned as becoming somewhat outdated because the polyester type of base was gaining in popularity over the cellulose acetate type. According to Canadian Kodak:

"while the basic chemical components of various base films are different - polyester resin, cellulose acetate, and cellulose acetate butyrate are presently used - the base films are all sufficiently similar from the standpoint of their use and characteristics to be recognized as a separate article of trade. This supports our request for a single tariff item in the present tariff schedule and for categorization in 'List 3' /while not made in Canada/ under BN 39.01 and BN 39.03 with rates of B.P. 0% M.F.N. 0%." (5)

(1) Transcript, Vol. 159, p. 23611

(2) Same, Vol. 123, p. 18474

(3) Same, Vol. 123, p. 18475

(4) Same, Vol. 161, p. 23970

(5) Same, Vol. 160, p. 23753

AnSCO of Canada Limited indicated in its submission that "if there is to be a single tariff item covering photographic film, it should permit foreign manufacturers to import photographic film in rolls, sensitized or unsensitized, for use in the manufacture of photographic film by such manufacturers duty free." (1) It was pointed out that the company, in order to remain competitive and maintain its position in the Canadian market, had invested in facilities to convert the imported master rolls of sensitized base film into commercial sizes by slitting, cutting, testing and packaging. It was further stated:

"Any tariff change which necessitates a manufacturer of film and papers expending vast quantities of capital for a limited market would be unreasonable and will result in a complete monopoly in the photographic industry in Canada, virtually eliminating not only AnSCO but any other foreign manufacturer from competing in the Canadian market. Other than Canadian Kodak, we know of no other manufacturer of film and paper in this country, and after spending a very substantial amount of capital the future success of AnSCO as a manufacturer in Canada should not now be jeopardized." (2)

In the view of the spokesman for AnSCO both the unsensitized base film imported by Kodak and the large rolls of sensitized film imported by AnSCO were intermediate stages in the manufacture of the final photographic film and should, therefore, be treated for tariff purposes in the same manner. AnSCO's spokesman further said that it sought to fit what it proposed to import, namely, the master rolls of sensitized film under tariff item 822. Kodak, however, objected to the proposal by AnSCO for including sensitized film imports under a duty-free classification since it would "affect the exceedingly large capital investment and the whole sensitizing process which Kodak now carries on." (3) The spokesman for Kodak also indicated that master rolls of sensitized film or paper are imported by Kodak under item 187, at rates of Free, B.P., 20 p.c., M.F.N.; item 187 is outside Reference 120. However, a new temporary item, 187g, was introduced in July, 1964 which provides for sensitized film and sensitized paper in rolls not less than thirty inches in width for use in the manufacture of photographic films and papers, at rates of Free, B.P., 12½ p.c., M.F.N. This item would apply to the sensitized "master rolls" of interest to AnSCO; it does not, however, provide the duty-free entry under the M.F.N. Tariff requested by AnSCO at the hearing on Reference 120, to parallel the provision for unsensitized rolls under tariff item 822.

Other views, moreover, were expressed that sensitized base film would properly come under Chapter 37 of the B.T.N., which pertains to photographic goods.

(1) Transcript, Vol. 160, p. 23779

(2) Same, Vol. 160, p. 23779

(3) Same, Vol. 160, p. 23804

Analysis of Proposals

With the exception of companies interested in cellulose acetate photographic film, the present duty-free entry of cellulose acetate in its basic forms appears to be generally satisfactory to the interested parties. The producer of cellulose acetate flake indicated no need of protection in circumstances where the company's costs are competitive with those of producers in other countries.

Except for the proposal by the British Plastics Federation, no representations were made on foamed and expanded cellulose plastics (tariff item 914), manufactures of plastics, n.o.p., (tariff item 915(c)), reinforced or supported cellulose plastics (tariff item 917(a) and (b)), or collars and cuffs of cellulose plastics (tariff item 577). These tariff items provide rates of duty, generally 15 or 20 p.c. under the M.F.N. Tariff, for various manufactured or processed forms of cellulose plastics. Similarly, no submissions were received pertaining to beads, drops and other shapes of cellulose acetate which may be imported free of duty when for use in the manufacture of imitation pearls (tariff item 326d).

With respect to photographic film, the basic material is not made in Canada and the request of both companies was for continued free entry. However, of the two types discussed, sensitized and unsensitized cellulose acetate film, only the latter, which enters under item 822, appears to be within the Board's terms of reference and within the scope of B.T.N. Chapter 39.

CELLULOSE NITRATE

This product is also known as nitrocellulose, cotton solution, nitrocotton, guncotton and collodion cotton. It is a cotton-like, or pulp-like, inflammable material of variable composition obtained by treating cellulose (usually cotton linters or wood-pulp) with a mixture of nitric and sulphuric acids. Significant differences in properties such as flammability, solubility and viscosity are obtained by varying the strength of the acids, the temperature, the time of nitration and the proportion of acids to cellulose.

Cellulose nitrate has a variety of uses which depend generally upon the nitrogen content of the material. Broadly speaking, cellulose nitrate of approximately 13 per cent nitrogen is used for explosives; that employed in lacquers and photographic film is about 12 per cent and that used in plastics is about 11 per cent nitrogen.⁽¹⁾ Cellulose nitrate when plasticized with camphor in the presence of alcohol produces celluloid, the pioneer plastic material. Cellulose nitrate plastic is the toughest of all the thermoplasts and also one of the easiest to fabricate but because of its sensitivity to heat, it is not adaptable to modern techniques of compression or injection moulding. However, extruded in the form of sheets, rods and tubes, cellulose nitrate is still used in the manufacture of many items of decorative and functional value, such as personal accessories, toilet articles and various types of industrial pieces. Soluble cellulose nitrate in

(1) Modern Plastics Encyclopedia, 1965, p. 104

conjunction with various types of plasticizers is widely used in the production of lacquers, coated fabrics and papers. Solutions of nitro-cellulose in a mixture of ether and alcohol are known as collodions which are used in cementing, lithography, coating wounds and abrasions, and in the manufacture of artificial leather and artificial pearls.

Cellulose nitrate is available in soluble, smokeless and dynamite grades. The smokeless was said to be not an article of commerce, as such, in Canada but to be imported in the form of smokeless powder, dealt with under heading 36.01 in this report. The other varieties are also commonly referred to as dynamite and industrial (non-dynamite) types.

Because of their inflammable nature, all types of cellulose nitrate must be transported damped with alcohol, generally ethyl or butyl alcohol, or with water. The Canadian Board of Transport Commissioners and the U.S. Interstate Commerce Commission require a dampener for the shipment of all these materials. Usually, cellulose nitrate is shipped in a heavily galvanized steel drum of special construction.

The Industry

Only cellulose nitrate of dynamite grade (known also as nitrate cotton or nitrocotton) is made in Canada. The sole manufacturer is Canadian Industries Limited at Beloeil, Quebec, and the product is shipped, wetted with water, to the company's explosives-producing plants at Brainerd, Man., Calgary, Alta. and James Island, B.C. Some of the raw materials, such as nitric and sulphuric acids, are also produced in Canada but the cotton linters are imported usually from the U.S.A. Nitrocotton is said to be used only in the manufacture of nitroglycerin-type explosives in Canada.

C.I.L. stated during the public hearings that it had "adequate capacity to manufacture all the nitrocotton used in Canada" and the company also claimed that its "operation is economical and efficient, and would enable the Company to offer quality and price comparable with that available in the United States."⁽¹⁾

The manufacture of industrial grade cellulose nitrate requires the use of somewhat different processing techniques and additional equipment than that employed for the dynamite type and the Board was told that the Canadian market "is not sufficiently large to justify the capital investment which would be required to make this grade."⁽²⁾ Growth prospects, moreover, are not encouraging because of competitive substitutes.

(1) Transcript, Vol. 107, p. 16189

(2) Same, Vol. 159, p. 23645

The Market

Published data on nitrocotton are not available. All C.I.L.'s production is captive to the company's explosives manufacturing operations. The geographic distribution of use appears to follow that for nitroglycerin explosives with about 75 per cent used in Ontario and Quebec and most of the rest in Western Canada.

Imports of this material are not separately recorded. It appears that the only other commercial user of nitrocotton in Canada is Du Pont of Canada Limited which obtains its supplies from its parent company in the U.S.A.

Exports of nitrocotton have been negligible in the past. C.I.L. indicated that it had not been able to export nitrocotton to the U.S.A. because that country had a tariff of 20¢ per pound, the equivalent of about 55 per cent ad valorem, based on the U.S. selling prices of nitrocotton.⁽¹⁾

The amount of industrial grade cellulose nitrate consumed in Canada is indicated in the following table.

Imports of Cellulose Nitrate (Other than Explosive Grade),
1962-64

	1962		1963		1964		
	'000 lb.	\$'000	'000 lb.	\$'000	'000 lb.	\$'000	\$/lb.
U. Kingdom	-	-	11.0	5.1	65.9	26.9	.41
Belg./Luxem.	10.0	2.7	147.2	38.0	123.3	31.9	.26
W. Germany	-	-	95.0	28.9	420.3	101.1	.24
U. States	<u>5,683.3</u>	<u>1,801.1</u>	<u>5,275.4</u>	<u>1,718.4</u>	<u>5,548.6</u>	<u>1,782.3</u>	<u>.32</u>
	5,693.3	1,803.8	5,528.6	1,790.4	6,158.1	1,942.1	.32

Source: D.B.S., Trade of Canada, Cat. No. 65-007

Imports, which averaged about 5.8 million pounds in the period 1962-64, were almost all from the U.S.A. The incidence of imports from the U.S.A. was said to be high because nitrocellulose must be handled in a special container which, once the duty is paid on it, can be readily shuttled back and forth between the U.S.A. and Canada.

The major users of industrial grade cellulose nitrate are the paint and varnish manufacturers. In 1962 and 1963 they consumed almost 4 million pounds, valued at more than \$1.3 million; this was about 70 per cent of total imports. Other users include the manufacturers of coated fabrics, coated regenerated cellulose film and manufacturers of many other specialty products including buttons and leather finishes.

⁽¹⁾ Transcript, Vol. 107, p. 16189

Imports of cellulose nitrate in sheet form were estimated at about 50,000 pounds in recent years.⁽¹⁾

Prices of Canadian nitrocotton are not established because of the lack of a commercial market. The U.S. selling price was said to be about \$36.50 per hundred pounds. Certain grades of the industrial nitrocellulose type (other than explosive) were quoted at about \$0.39 per pound in the U.S.A. in 1963 and 1964.⁽²⁾ The average value of imports in these years was about \$0.32 per pound.

Tariff Considerations

The various forms and grades of cellulose nitrate are entered under the items listed below.

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation- Tariff</u>
666 Nitro-glycerine, giant powder, nitro and other explosives, n.o.p.....per pound	1 $\frac{3}{4}$ ¢	2 $\frac{1}{4}$ ¢
909 (a) Esters or ethers, or combinations thereof, of cellulose (but not including water soluble cellulose esters or ethers), without admixture:-		
1. Cellulose nitrate containing not more than 12.2 per cent by weight of nitrogen	Free	Free
909 (b) Cellulose nitrate containing not more than 12.2 per cent by weight of nitrogen, when wet with not more than 35 per cent by weight of alcohol	Free	Free
(c) Esters or ethers, or combinations thereof, of cellulose, in organic solvents, where the solvent is not more than 60 per cent by weight, without other admixture:-		
1. Cellulose nitrate containing not more than 12.2 per cent by weight of nitrogen, except as provided for under (b) above	10 p.c.	10 p.c.
911 Compositions of esters or ethers of cellulose (except water soluble esters or ethers of cellulose) with other materials, n.o.p.	10 p.c.	10 p.c.

(1) Canadian Plastics, Feb. 1965, p. 30

(2) Oil, Paint and Drug Reporter

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
912 Cellulose plastics plates, sheets, film, sheeting or strips, not less than 6 inches in width, n.o.p.; cellulose plastics lay-flat tubing, not less than 6 inches in circumference, n.o.p.	Free	Free
913 Cellulose plastics plates, sheets, film, sheeting or strips, less than 6 inches in width, lay-flat tubing less than 6 inches in circumference, other tubing, blocks, bars, rods, non-textile monofilament; cellulose plastic profile shapes produced in uniform cross-section and imported in lengths: not further manufactured than moulded, cast, calendered, extruded or pressed, n.o.p.:— (a) Cellulose nitrate	Free	Free
915 Manufactures of cellulose plastics, n.o.p.:— (a) Cellulose nitrate	10 p.c.	20 p.c.

There were five submissions which referred specifically to cellulose nitrate. Canadian Industries Limited made two submissions. The first, related to cellulose nitrate, explosive grade, (nitrocotton) proposed that this material be dutiable at 15 p.c., B.P. and 20 p.c., M.F.N. under an item like B.T.N. heading 39.03.(1) Tariff item 666, which relates to imports of nitrocotton is discussed in the part of the report on explosives, B.T.N. heading 36.02. In the second submission, the company proposed that "cellulose nitrate (other than dynamite grade) when wet with not more than 35 per cent by weight of alcohol, without other admixture" be duty-free.(2) This wording was later modified by the company to accord with the proposal of Harrisons & Crosfield to replace the word "alcohol" by "a dampening agent".

Harrisons & Crosfield (Canada) Ltd., importers and distributors of soluble grade nitrocellulose, recommended that the wording of tariff item 909(a), or any new item that may replace it, be changed to the following:

"Cellulose nitrate (other than dynamite grade) when wet with not more than 35 per cent by weight of a dampening medium, without other admixture."

The company proposed that cellulose nitrate, meeting the above definition, be permitted free entry under both the B.P. and M.F.N. Tariffs until made in Canada.

(1) Transcript, Vol. 107, p. 16190

(2) Same, Vol. 159, p. 23644

The Canadian Paint Varnish and Lacquer Association supported Harrisons & Crosfield's proposed change in wording of item 909(a) as well as the free entry of cellulose nitrate.⁽¹⁾

The Tariff Sub-Committee of the Moulders and Extruders Division of the Society of the Plastics Industry (Canada) Inc., in a general submission made at an earlier hearing, recommended that "cellulose nitrate (other than dynamite grade) when wet with not more than 35 per cent by weight of alcohol, without other admixture" be classified under B.T.N. heading 39.03 and remain duty-free.⁽²⁾

Both Canadian Kodak Company Limited and the Association of Motion Picture Producers and Laboratories of Canada, in their submissions on cellulose acetate, indicated that tariff item 915(b) was archaic in that nitrate base stock has been replaced entirely by acetate base stock for the manufacture of motion picture film.⁽³⁾ This matter has been further discussed under cellulose acetate.

There were no opposing views presented to the Board in regard to the proposals concerning either cellulose nitrate, explosive grade, or cellulose nitrate, soluble grade.

Arguments in support of tariff proposals

Canadian Industries Limited, concerning nitrocotton, noted that it had both the capacity and efficiency required to supply the entire Canadian market with materials competitive in quality and price with those of the U.S.A.⁽⁴⁾ The company did not indicate why rates of 15 p.c., B.P., 20 p.c., M.F.N. were necessary, except to say that it could not export to the U.S.A. because of the tariff in that country and to note that these were the rates generally recommended by the Industry Committee.

In regard to cellulose nitrate (other than dynamite grade), the company claimed to be a very large consumer of soluble grade cellulose nitrate in the manufacture of lacquers, coated fabrics and coated papers and stated:

"Since the product or substitutes suitable for the purpose are not obtainable from Canadian sources, duties at the heading rates proposed would greatly increase our raw material costs without adding any benefit to the Canadian economy.

"Unfortunately, the equipment which the company uses to manufacture dynamite grade cellulose nitrate is not suitable for the manufacture of other grades, and the size of the Canadian market for soluble cellulose nitrate is not sufficiently large to justify the capital investment which would be required to make this grade."⁽⁵⁾

(1) Transcript, Vol. 159, p. 23680

(2) Same, Vol. 124, p. 18513

(3) Same, Vol. 160, p. 23762, 23807

(4) Same, Vol. 107, p. 16189

(5) Same, Vol. 159, p. 23644

It was also pointed out that the present wording of tariff items 909(a) and 909(b) was not satisfactory owing to an overlapping in nitrogen content between the dynamite and soluble types. It was contended that there are types of dynamite grade cellulose nitrate with less than 12.2 per cent nitrogen and soluble type cellulose nitrate with more than 12.2 per cent nitrogen. It was, therefore, proposed that the distinction should be on the basis of the trade terminology rather than nitrogen content and the spokesman for C.I.L. expressed the view that use of the terminology "dynamite grade" would be "the most effective means of ensuring that the interests of the Canadian manufacturer of nitrocotton -- that is, C.I.L. -- and those companies which must import other grades of cellulose nitrate, can be protected."(1)

Although different proposals for the two types of cellulose nitrate seemed generally acceptable to the interested parties, no specifications were recommended for inclusion in the tariff item if the criterion of nitrogen content were removed. However, a spokesman for C.I.L. suggested that the distinction could be administered on the basis of viscosity and colour. A demonstration was given before the Board of a standard method of testing in which a small steel ball is permitted to fall to the bottom of two containers, one filled with the most viscous industrial grade and the other, the dynamite grade cellulose nitrate.

The spokesman for C.I.L., conducting the test, noted:

"The first example which, as you can see, is a colourless solution, is a solution of 2% of the so-called industrial grade of cellulose nitrate...used mainly in, say, lacquer preparations...it is a colourless solution, and is very free-flowing...This material -- lacquer grade cellulose nitrate -- is the highest viscosity material of the type which I was able to obtain...

"In the second bottle I have a sample of our dynamite grade cellulose nitrate, again in 2% solution, in the same solvent as was used for the other material, and, as you will see, this material is almost a gel -- an extremely viscous material. It has quite a yellow colour, and that is one reason why it is not suitable for lacquers...the steel ball...takes the order of a minute to pass from one end of this container to the other."(2)

This time compared with an estimated time of less than a second for the ball in the lacquer grade cellulose nitrate.

Harrisons & Crosfield stated that B.T.N. 39.03 "does not differentiate between explosives grade nitrocellulose and the soluble type. The Canadian Tariff wisely recognizes that they are quite unlike each other in important respects and classifies them under

(1) Transcript, Vol. 159, p. 23634

(2) Same, Vol. 159, p. 23634-35

separate items This separation should be retained."⁽¹⁾ However, according to the company, the distinction between soluble grade cellulose nitrate and dynamite grade made in item 909(b), while satisfactory when it was written, does not meet today's conditions because "Certain special types of dynamite grade are now produced with less than 12.2 per cent nitrogen and might enter free even though they are quite unsuitable for use as soluble grade."⁽²⁾ On the question of the use of the word "alcohol" in the present Tariff to describe the dampening agent, the company stated that "alcohol" usually implied ethyl alcohol but that for some time, other kinds of alcohol such as butyl and isopropyl have been used as a dampening agent of cellulose nitrate. In addition, certain grades of cellulose nitrate were said to be available in the U.S.A. dampened with water and, in the light of these circumstances, a phrase like "a dampening medium" would be more suitable.

The Canadian Paint Varnish and Lacquer Association's spokesman supported the proposal to restrict the percentage of dampener to 35 per cent by weight on the grounds that if 50 per cent were allowed it might include something that approached lacquer. A level of 35 per cent was considered high enough to dampen the product sufficiently to remove its hazardous nature and at the same time low enough to exclude a paint product or a lacquer.

OTHER RESINS AND RELATED MATERIALS OF 39.03

Apart from those resins and related materials discussed separately above, there are two other groups of products under this heading which were brought to the attention of the Board. The first group, cellulose esters, include materials such as cellulose acetate butyrate and cellulose propionate. The second group, cellulose ethers, include products such as ethyl cellulose, hydroxyethyl cellulose, ethyl hydroxyethyl cellulose, benzyl cellulose, methyl cellulose and sodium carboxymethyl cellulose.

Cellulose Esters

Cellulose Acetate Butyrate

According to the B.T.N., cellulose acetate butyrate is a cellulose ester-forming plastic of similar general character to those formed with cellulose acetate. As with cellulose acetate, cellulose acetate butyrate resin is available in white flakes or granules and is convertible into plastic films, sheets and moulded objects. The main uses are in the manufacture of thermoplastic moulding compositions, photographic film, lacquers, protective coating solutions and protective strip castings.

Cellulose acetate butyrate moulding compound is a tough, fast moulding material and the finished products possess good dimensional stability and resistance to outdoor exposure. It is used for making objects such as steering wheels, business machine keys and housings, tool handles, light fixtures and pipes.

(1) Transcript, Vol. 159, p. 23664

(2) Same, Vol. 159, p. 23665

Cellulose acetate butyrate resins or moulding powders are not manufactured in Canada. Imports of these materials in 1962 totalled about 1,371,000 pounds valued at \$870,000 and reached 1,647,000 pounds valued at \$1,040,000 in 1964, an increase of about 20 per cent from 1962. All imports came from the U.S.A. Large amounts of these imports probably are in the form of compounds and a portion, valued, in 1961, at about \$22,000, is in organic solvent for the use of the paint industry.(1)

Import statistics are not available specifically on cellulose acetate butyrate film and sheet, commercial and photographic type. This film is more expensive than cellulose acetate film and is less extensively used, although in the last few years, it has been gaining in importance, especially the photographic type.

Cellulose acetate butyrate in 1964 was quoted in the U.S.A. at 54.5¢ per pound, delivered, for powder of 17 per cent butyryl content and at 58.5¢ per pound for 50 per cent butyryl content.(2)

Tariff considerations

Cellulose acetate butyrate, in its various forms, is entered principally under items listed below.

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
909 (a) Esters or ethers, or combinations thereof, of cellulose (but not including water soluble cellulose esters or ethers), without admixture:-		
3. Cellulose acetate butyrate	Free	Free
909 (c) Esters or ethers, or combinations thereof, of cellulose, in organic solvents, where the solvent is not more than 60 per cent by weight, without other admixture:-		
3. Cellulose acetate butyrate	10 p.c.	10 p.c.

(1) Transcript, Vol. 159, p. 23697

(2) Oil, Paint and Drug Reporter

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>	
910	Esters or ethers, or combinations thereof, of cellulose compounded with other materials, in any form, including scrap or waste, for moulding, casting, extruding, calendering, pressing, (moulding compositions or materials for processing into moulding compositions)	Free	Free
911	Compositions of esters or ethers of cellulose (except water soluble esters or ethers of cellulose) with other materials, n.o.p.	10 p.c.	10 p.c.
912	Cellulose plastics plates, sheets, film, sheeting or strips, not less than 6 inches in width, n.o.p.; cellulose plastics lay-flat tubing, not less than 6 inches in circumference, n.o.p.	Free	Free
913	Cellulose plastics plates, sheets, film, sheeting or strips, less than 6 inches in width, lay-flat tubing less than 6 inches in circumference, other tubing blocks, bars, rods, non-textile monofilament; cellulose plastics profile shapes produced in uniform cross-section and imported in lengths: not further manufactured than moulded, cast, calendered, extruded or pressed, n.o.p.		
	(b) Other	15 p.c.	15 p.c.
915	Manufactures of cellulose plastics, n.o.p.:-		
	(c) Other	15 p.c.	20 p.c.
924a	Bars, rods and profile shapes of uniform cross-section of cellulose plastic, except cellulose nitrate, when imported in lengths for use in the manufacture of hand tools	10 p.c.	10 p.c.

Item	British Preferential Tariff	Most- Favoured- Nation Tariff
924c Cellulose plastics plates or sheets, less than 6 inches in width, for use in the manufacture of spectacle and eyeglass frames	Free	Free

There were six submissions on various products of chapter 39.03 which included reference to cellulose acetate butyrate. Canadian General-Tower Limited, a manufacturer of vinyl type products, proposed that the present wording and rates of item 909(a)3 be retained.⁽¹⁾ The Canadian Paint Varnish and Lacquer Association also requested that cellulose acetate butyrate of item 909(a)3, which is not produced in Canada, be entitled to duty-free entry under B.T.N. 39.03.⁽²⁾ Canadian Buttons Limited requested that cellulose acetate butyrate moulding granules now under item 909(a)3, be incorporated as an item under B.T.N. heading 39.03, duty-free.⁽³⁾ The British Plastics Federation, in its submission on various B.T.N. headings, requested that "other cellulose derivatives (esters and ethers) and plastics materials made therefrom, the bulk of which are duty free (B.P.T.) under items 909(a) and 910" continue free of duty.⁽⁴⁾

In a submission from the American Optical Company there was reference to plastic polaroid lens blanks made of polyvinyl alcohol film and cellulose acetate butyrate sheets which are used in the manufacture of sun-glasses.⁽⁵⁾ Since these lens blanks do not fall under 39.03, the submission is dealt with under B.T.N. heading 39.07.

Canadian Kodak Company Limited and Ansco of Canada Limited, in their submissions on cellulose acetate, also included cellulose acetate butyrate. These submissions are more fully dealt with under cellulose acetate; Kodak's request for free entry for photographic base film related also to cellulose acetate butyrate to be coated with haloid emulsion, as well as to cellulose acetate film.⁽⁶⁾ Ansco's request for free entry would include cellulose acetate butyrate coated, or to be coated, with haloid emulsion.⁽⁷⁾

Cellulose Propionate

This material consists essentially of cellulose propionate and plasticizers with or without colouring matter and is available in

(1) Transcript, Vol. 156, p. 23153

(2) Same, Vol. 159, p. 23690

(3) Same, Vol. 161, p. 23974

(4) Same, Vol. 123, p. 18479

(5) Same, Vol. 160, p. 23707

(6) Same, Vol. 160, p. 23754

(7) Same, Vol. 160, p. 23778

pellets for injection and extrusion moulding. It is an unusually stable cellulose ester, emitting no odour of propionic acid either during moulding or in the finished product. It is used for pens and pencils, telephone housings, ladies' shoe heels, toys, transistor radio and television parts and other products which need the toughness of propionate.

This material is not made in Canada. One consumer, Northern Electric Company Limited, made the only submission on cellulose propionate and indicated that this product is used by the company in the manufacture of telephone housings, handles, receiver and transmitter caps and other telephone parts.⁽¹⁾ However, acrylonitrile-butadiene styrene (ABS) and cellulose propionate appear to be interchangeable for these applications and cellulose propionate, which at one time was used exclusively, is now being replaced by ABS because of the latter's quality and price advantage. Northern Electric's ABS requirements were said to be practically double in 1963 what they had been in previous years, whereas the use of cellulose propionate was decreasing. Cellulose propionate was said to have been a preferred material for about two and a half years previous to that, and had been imported in granular form principally from the U.S.A.

Northern Electric requested that cellulose propionate moulding compound remain duty-free until ruled to be of a class or kind made in Canada.

Cellulose Ethers

Carboxymethylcellulose (sodium carboxymethylcellulose)

This material is a water-soluble cellulose ether sold in Canada under the trade name of "Carboxel" and often called CMC. It is compatible in varying proportions with many water-soluble plasticizers, natural gums and other film formers. CMC is devoted to a variety of uses such as water binder, thickener, suspending agent, film-former and emulsion stabilizer for detergents and soaps; it is also used in textile and paper sizing, latex paints, drilling muds, foods and pharmaceuticals, and as a protective colloid replacing, or in combination with, natural water-soluble gums.

Carboxymethylcellulose is manufactured in Canada by Chemical Developments of Canada Limited, a division of Domtar Chemicals Limited, at Longford Mills, Ont. It is made by impregnating cellulose with sodium hydroxide to form alkali cellulose which reacts with monochloroacetic acid.

There are two principal consumers of this product, the manufacturers of soap and cleaning compounds who reported a consumption of 844,000 pounds of CMC valued at more than \$206,000 in 1957, and the paint and varnish manufacturers who consumed 29,000 pounds valued at \$24,000 for the same year, making a total for 1957 of 873,000 pounds valued at \$230,000. Consumption by these two groups of users experienced considerable increase; by 1963 the total was 1.5 million pounds valued at \$419,000. The manufacturers of soaps and cleaning compounds used 1.4 million pounds, in that year and the paint manufacturers, 135,000 pounds.⁽²⁾

(1) Transcript, Vol. 150, p. 22379

(2) D.B.S., Cat. Nos. 46-214, 46-210

Imports of sodium carboxymethylcellulose were estimated at \$685,000 in 1963, a substantial increase from 1957 when they were \$140,000. Imports, therefore, appear to supply a substantial part of total Canadian requirements.

In the years, 1952-65, delivered prices of CMC in the U.S.A. ranged from 40¢ to 60¢ per pound depending upon grade and quantity of purchase.⁽¹⁾

This material is imported under tariff item 711 at 15 p.c., B.P. and 20 p.c., M.F.N. and under the end-use items 492a, 492d and 848b free of duty for use in drilling for oil, natural gas, potash or rock salt. These end-use items are not part of Reference 120.

Chemical Developments of Canada Limited made a submission on sodium carboxymethylcellulose in which it requested the continuation of the present duty rates of 15 p.c., B.P. and 20 p.c., M.F.N. of item 711.⁽²⁾ Harrisons & Crosfield indicated that it imported carboxymethylcellulose but, because the product is made in Canada, the company did not include it with other products of heading 39.03, not made in Canada, for which free entry had been proposed.⁽³⁾

In justifying its position, Chemical Developments maintained the view that costs of raw materials, plant supervision, research, technical service, sales and other cost elements were higher in Canada than in some other countries and that the small Canadian market does not justify a large capital outlay for a continuous or semi-continuous operation to achieve low unit labour costs. It was further stated that "if it were not for the present duty rates under Tariff Item 711 this Company would not be producing CMC."⁽⁴⁾

The Canadian Pharmaceutical Manufacturers Association included sodium carboxymethylcellulose in a list of materials used by its members for which end-use treatment was proposed, with suggested rates of Free B.P., 15 p.c., M.F.N., for those not made in Canada and of 15 p.c., B.P., 20 p.c., M.F.N., for those made in Canada.⁽⁵⁾

The Canadian Pulp and Paper Association, in its general brief opposing any increases in duties on materials used by its members, listed as such, sodium carboxymethylcellulose which is used for surface coating or as a coating binder.⁽⁶⁾

Ethyl Cellulose

This material is an ethyl ether of cellulose and is available as granules. Its properties vary depending upon the degree to which hydroxyl radicals of cellulose have been replaced by ethoxy groups. The common commercial grade appears to have 47 or 48 per cent ethoxy content. It is soluble in a number of organic solvents but quite insoluble in water.

(1) Oil, Paint and Drug Reporter, various issues

(2) Transcript, Vol. 159, p. 23617

(3) Same, Vol. 159, p. 23668-9

(4) Same, Vol. 159, p. 23620

(5) Same, Vol. 87, p. 13304

(6) Same, Vol. 129, p. 19359

Ethyl cellulose is devoted to such uses as injection moulding plastics, sheeting, cast film, protective coatings, adhesives, cable lacquers, extrusion wire insulation, printing inks, cloth coating and textile finishing.

Ethyl cellulose is not made in Canada and domestic requirements are imported largely from the U.S.A. Canadian consumption of this material has been estimated at about 70,000 pounds per annum in the four years prior to 1965. The plastic fabricators consumed in 1961 about 50,000 pounds of ethyl cellulose valued at about \$36,000 and the paint and varnish manufacturers around 17,500 pounds valued at \$14,600.⁽¹⁾ However, imports of ethyl cellulose were reported to be much larger than these available consumption figures indicate, being valued at \$515,000 in 1963, suggesting a quantity in excess of 700,000 pounds. The precise form of these imports is not known.

Ethyl cellulose, freight allowed, has been quoted in the U.S.A. at 68¢ per pound for the four years 1962 - 1965.⁽²⁾

Ethyl cellulose, in its various forms, is entered principally under items listed below.

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
909 (a) Esters or ethers, or combinations thereof, of cellulose (but not including water soluble cellulose esters or ethers), without admixture:-		
5. Ethyl Cellulose	Free	Free
(c) Esters or ethers, or combinations thereof, of cellulose, in organic solvents, where the solvent is not more than 60 per cent by weight, without other admixture:-		
5. Ethyl Cellulose	10 p.c.	10 p.c.
910 Esters or ethers, or combinations thereof, of cellulose compounded with other materials, in any form, including scrap or waste, for moulding, casting, extruding, calendering, pressing, (moulding compositions or materials for processing into moulding compositions)	Free	Free

(1) D.B.S., Cat. Nos. 46-210 and 47-208

(2) Oil, Paint and Drug Reporter, various issues

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most Favoured- Nation Tariff</u>
911 Compositions of esters or ethers of cellulose (except water soluble esters or ethers of cellulose) with other materials, n.o.p.	10 p.c.	10 p.c.
912 Cellulose plastics plates, sheets, film, sheeting or strips, not less than 6 inches in width, n.o.p.; cellulose plastics lay-flat tubing, not less than 6 inches in circumference, n.o.p.	Free	Free
913 Cellulose plastics plates, sheets, film, sheeting or strips, less than 6 inches in width, lay-flat tubing less than 6 inches in circumference, other tubing, blocks, bars, rods, non-textile monofilament; cellulose plastics profile shapes produced in uniform cross-section and imported in lengths: not further manufactured than moulded, cast, calendered, extruded or pressed, n.o.p.:- (b) Other	15 p.c.	15 p.c.
915 Manufactures of cellulose plastics, n.o.p.:- (c) Other	15 p.c.	20 p.c.

There were three submissions made to the Board relating specifically to ethyl cellulose. The Canadian Paint Varnish and Lacquer Association requested that ethyl cellulose of item 909(a)5 be entitled to duty-free entry under B.T.N. 39.03.⁽¹⁾ Canadian General-Tower Limited proposed that the present wording and rates of item 909(a)5 be retained.⁽²⁾ Harrisons & Crosfield (Canada) Ltd. supported free entry of ethyl cellulose under both B.P. and M.F.N. headings until it is made in Canada, noting the intention that "This will place it in the same position under the tariff as other cellulose derivatives not soluble in water."⁽³⁾

(1) Transcript, Vol. 159, p. 23690

(2) Same, Vol. 156, p. 23153

(3) Same, Vol. 159, p. 23667

The Canadian Pharmaceutical Manufacturers Association included ethyl cellulose in a list of materials used by its members for which end-use treatment was requested, with suggested rates of Free, B.P., 15 p.c., M.F.N., for those not made in Canada and of 15 p.c., B.P., 20 p.c., M.F.N., for those made in Canada.⁽¹⁾

The Canadian Pulp and Paper Association, in its general brief opposing any increases in duties on materials used by its members, listed as such ethyl cellulose used for surface coating or as a coating binder.⁽²⁾

Ethyl Hydroxyethyl Cellulose

This material is a cellulose ether available in granular solid form and in extra low, low, and high-viscosity types. It is commonly known as "EHEC" and is soluble in organic solvents but not in water. It is used as a film former in silk screen and gravure printing inks and protective coatings.

EHEC is not made in Canada and there are no statistics available to evaluate its commercial importance. At present it is entered chiefly under tariff item 909a(7), free of duty under both B.P. and M.F.N.

Harrisons & Crosfield (Canada) Limited in its submission to the Board requested that the present rates on EHEC be continued until it is made in Canada.

Hydroxyethyl Cellulose

Hydroxyethyl cellulose is a white, free-flowing powder, soluble in water. Upon drying, it produces clear and colourless films which possess good heat and light stabilities and are readily soluble in water but insoluble in organic solvents. It is used, among other things, as a thickening and suspending agent and also as a stabilizer for vinyl polymerization.

The material is not made in Canada and there is no available data on consumption. Imports enter under item 208t at rates of Free, B.P., 15 p.c., M.F.N. Harrisons & Crosfield supported the proposal recorded by the Industry Committee that hydroxyethyl cellulose be permitted free entry until made in Canada.

The Canadian Pharmaceutical Manufacturers Association included hydroxyethyl cellulose in a list of materials used by its members for which end-use treatment was requested, with suggested rates of Free, B.P., 15 p.c., M.F.N. for those not made in Canada and of 15 p.c., B.P., 20 p.c., M.F.N., for those made in Canada.

(1) Transcript, Vol. 87, p. 13304

(2) Same, Vol. 129, p. 19359

Methyl Cellulose and Cellulose Acetate Phthalate

Methyl cellulose is a methyl ether of cellulose, available as a grayish white fibrous powder, soluble in water. It is used as a thickener and stabilizer in paints, an emulsifying and sizing agent, and as an adhesive. It is considered to be of growing importance to paint makers as a result of a greater demand for emulsion-type paints (water-base paints). Value of annual usage of methyl cellulose by the paint industry was said to be close to \$100,000 and the major source of supply was said to be the U.S.A.⁽¹⁾

Methyl cellulose enters at present under tariff item 208t. The Canadian Paint Varnish and Lacquer Association requested that this material be entitled to duty-free entry under B.T.N. 39.03.⁽²⁾ Harrisons & Crosfield (Canada) Ltd. supported the proposal for a free entry of methyl cellulose until it is made in Canada.⁽³⁾

The Canadian Pulp and Paper Association, in its general brief opposing any increases in duties on materials used by its members, listed as such methyl cellulose used for surface coating or as a coating binder.⁽⁴⁾

The Canadian Pharmaceutical Manufacturers Association included methyl cellulose,⁽⁵⁾ and cellulose acetate phthalate⁽⁶⁾ in a list of the more important materials used by its members, for which end-use treatment was requested, with rates of Free B.P., 15 p.c., M.F.N. for those not made in Canada and of 15 p.c., B.P., 20 p.c., M.F.N. for those made in Canada.

For products of this heading for which no other proposal was received, the Industry Committee recommended rates of 15 p.c., B.P., 20 p.c., M.F.N. as a residual provision for the heading.

(1) Transcript, Vol. 159, p. 23690

(2) Same, Vol. 159, p. 23690

(3) Same, Vol. 159, p. 23667

(4) Same, Vol. 129, p. 19359

(5) Same, Vol. 87, p. 13304, 13309

(6) Same, Vol. 87, p. 13306, 13316

HARDENED PROTEINS (FOR EXAMPLE, HARDENED
CASEIN AND HARDENED GELATIN) - B.T.N. 39.04

Proteins, a large group of compounds of great importance in the structure and functioning of living matter, are compounds of large molecular weight containing substances such as carbon, hydrogen, oxygen and nitrogen. Apart from other functions, they are suitable for processing into plastics, although only a few of these plastics are of commercial importance. For the purpose of this heading, only proteins which have been chemically processed to harden them are included, such as hardened casein and hardened gelatin as well as "artificial guts" (sausage casings) obtained from hide or skin waste. Food casings of regenerated cellulose are discussed under heading 39.03.

Casein plastic is a very tough, non-flammable, thermoplastic or thermosetting material, readily coloured, moulded and polished. It is made from paracasein (prepared from fresh skim milk by the action of rennet) with water, pigment, plasticizer and alum, and pressed or extruded to form thermoplastic sheets or rods. Usually the end products are moulded from this stock before hardening with formaldehyde, which converts the casein to a thermosetting condition. Formaldehyde seems to be the only agent which has been economically successful in transforming casein into usable thermosetting plastics.

Casein plastics are available in sheets, rods, tubes, discs and in special forms and products which include button blanks, loops, rings, buckles, beads, game counters and pushbuttons, as well as handles and various similar items.

Gelatin can also be hardened with formaldehyde and made into sheets and, to some extent, into rods. Hardened gelatin would appear to be of very minor commercial importance.

Protein plastic strips, rods and protein plastic button blanks are made in Canada by Canadian Plastics Limited, a subsidiary of Canadian Buttons Limited, at Montreal, Que., for its own use. The company also manufactures some of its rennet casein requirements, while some is imported.

Statistical data on Canadian production and imports are not available. It appears that there are small imports of protein plastic strips and rods from England, U.S.A. and Holland. Landed prices of these imports were said to be slightly higher than domestic prices.(1)

Hardened proteins and their manufactures are entered under the following items:

(1) Transcript, Vol. 162, p. 24011

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
919 Protein plastics sheets, strips, tubing, blocks, bars, rods; other protein plastics profile shapes produced in uniform cross-section and imported in lengths; not further manufactured than moulded, extruded or pressed	Free	Free
920 Manufactures of protein plastics, n.o.p.	15 p.c.	20 p.c.

The Canadian Pulp and Paper Association, in its general brief opposing any increases in duties on materials used by its members, listed as such casein resins used in the production of coated papers.(1)

The only other submission relating particularly to heading 39.04 was from Canadian Buttons Limited which referred specifically to protein plastic strips, rods and button blanks. The company indicated that the present tariff, applicable to protein plastic button blanks in the rough, is item 920, with rates of 15 p.c., B.P. and 20 p.c., M.F.N. It was the company's suggestion that these rates be maintained by particular reference to this product under heading 39.04.(2)

With respect to protein plastic strips and rods, Canadian Buttons also suggested that more careful study be given to clarifying the wording of heading 39.04. There seems to be uncertainty as to whether these materials would be classified under heading 39.04, as a basic shape, under 39.07, as articles of plastic, or under heading 98.01, if in the form of button blanks. The spokesman for the company pointed out that a button blank can be the size, for example, of a quarter or a 50-cent piece with a thickness three or four times that of the coin. It has been blanked out of a sheet or sliced off a rod. To arrive at the final product, the material is further machined, polished and designed according to specifications.

The Explanatory Notes to the Brussels Nomenclature contain the following criteria in respect to these materials:

"Products which have been cut down to the point where the length does not exceed the maximum cross-sectional dimension, or which have been otherwise worked (drilled, milled, etc.) are classified as articles in heading 39.07 unless excluded from the present Chapter (39) or more specifically covered by some other heading in the Nomenclature."(3)

(1) Transcript, Vol. 129, p. 19359

(2) Same, Vol. 161, p. 23974

(3) Explanatory Notes to the Brussels Nomenclature, 1955, Vol. I, Third Impression, Jan. 1964, p. 372

Heading 98.01 provides for button blanks that are moulded and for other worked or fabricated blanks "clearly identifiable as intended for making buttons."

"On the other hand, a disc merely sawn or cut, but not further worked, is not regarded as a button blank and is to be classified according to the constituent material."(1)

It seems, therefore, that protein plastic strips and rods as well as rough button blanks merely sawn or cut, but not further worked, with length exceeding the maximum cross-sectional dimension are properly classified under heading 39.04. If the length of the blank does not exceed the maximum cross-sectional dimension or if it has been worked (drilled, milled, etc.), it would be classified under heading 39.07; the blanks of heading 98.01 would be more clearly identified as button blanks.

The Industry Committee proposed a residual provision for rates of 15 p.c., B.P., 20 p.c., M.F.N. for heading 39.04.

(1) Explanatory Notes to the Brussels Nomenclature, 1955, Vol. III, p. 1178

NATURAL RESINS MODIFIED BY FUSION (RUN GUMS);
ARTIFICIAL RESINS OBTAINED BY ESTERIFICATION
OF NATURAL RESINS OR OF RESINIC ACIDS (ESTER
GUMS); CHEMICAL DERIVATIVES OF NATURAL RUBBER
(FOR EXAMPLE, CHLORINATED RUBBER, RUBBER HYDRO-
CHLORIDE, OXIDISED RUBBER, CYCLISED RUBBER) -

B.T.N. 39.05

This heading includes resins which have been obtained by modifying the molecular structure of certain naturally occurring resinous substances. The few that are of commercial importance are not made in Canada and annual imports largely for paint and varnish use, amount to about \$3 million.

CHLORINATED RUBBER

Chlorinated rubber is a white, granulated powder, non-inflammable, non-toxic, odourless and tasteless, obtained by modifying the properties of natural rubber with fairly large amounts of chlorine (up to 65 per cent or more). It has good film-forming properties and resistance to attack by acids and alkalies and is suitable for use as a basis for anti-corrosive and chemical resistant paints. It is also used extensively in the manufacture of marine paints and road marking paints. Other uses include adhesives, printing inks and textile impregnation.

This material is not made in Canada. Canadian requirements, amounting to approximately 400,000 pounds valued at \$200,000, are imported largely from Britain and the U.S.A.⁽¹⁾ Almost all these imports are used by the paint industry.

Consumption of Chlorinated Rubber by Paint and Varnish Manufacturers, 1957-63

	<u>'000 lb.</u>	<u>\$'000</u>	<u>\$/lb.</u>
1957	233	123	.53
1958	253	147	.58
1959	214	113	.53
1960	272	155	.57
1961	356	210	.59
1962	387	214	.55
1963	320	181	.57

Source: D.B.S., Cat. No. 46-210

Consumption of 387,000 pounds of chlorinated rubber by the paint industry in 1962 represented an increase of almost 70 per cent over the 233,000 pounds consumed in 1957, but consumption by the industry was reported to be lower in 1963 than in 1962.

(1) Transcript, Vol. 161, p. 23933, 23943

The price of chlorinated rubber, in the range of 60 to 62 cents per pound, was represented as being twice or three times higher than that for other resins. The U.S. price for carload quantities was quoted at 60 cents for the last seven years and in the first quarter of 1965 was reduced to 58 cents per pound.(1)

Tariff Considerations

Chlorinated rubber is entered principally under the following items:

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
901(a) Synthetic resins without admixture, including scrap or waste:		
9. Other type	Free	Free
(b) Synthetic resins in the form of aqueous emulsions, aqueous dispersions or aqueous solutions, without admixture:		
8. Other type	Free	Free
(c) Synthetic resins in organic solvents where the solvent is not more than 60 per cent by weight, without admixture:		
5. Other type	10 p.c.	10 p.c.

Five submissions dealt specifically with chlorinated rubber. The Canadian Manufacturers of Chemical Specialties Association proposed duty-free entry for chlorinated rubber under an item like B.T.N. 39.05 until such time as it becomes commercially available from Canadian production.(2)

The Canadian Paint Varnish and Lacquer Association proposed that chlorinated rubber, at present classified under items 901(a)9 or 901(a)7, be allowed to enter Canada duty free, under both B.P. and M.F.N. Tariffs.(3)

Harrisons & Crosfield (Canada) Ltd. supported the recommendation for duty-free entry of chlorinated rubber.(4)

Imperial Chemical Industries Limited requested that "the B.P. duty on chlorinated rubber should remain at zero" unless and until sufficient quantities are available from Canadian production.(5)

(1) Oil, Paint and Drug Reporter

(2) Transcript, Vol. 148, p. 22060

(3) Same, Vol. 161, p. 23942

(4) Same, Vol. 161, p. 23878

(5) Same, Vol. 161, p. 23932

Schenectady Varnish Canada Ltd. supported the Industry Committee's recommendation for the adoption of the Brussels Nomenclature headings for tariff schedules applied to resins and plastics, and supported the general proposal for rates of duty of 15 p.c., B.P. and 20 p.c., M.F.N. for products under heading 39.05, except those not made in Canada.⁽¹⁾ This proposal regarding rates of duty, therefore, would not apply at present to chlorinated rubber.

OTHER PRODUCTS

B.T.N. heading 39.05 includes materials such as glycerol ester of rosin, glycerol ester of hydrogenated rosin, pentaerythritol ester of rosin, pentaerythritol ester of hydrogenated rosin and pentaerythritol ester of polymerized rosin. They are often more commonly known under various trade or commercial names; one of the most important appears to be ester gum.

Ester Gum

This substance is a glycerol ester of rosin. It is a hard synthetic resin produced by the esterification of natural resins such as rosin with polyhydric alcohols, especially glycerol, and to a minor extent, pentaerythritol. Ester gum is used in paints, varnishes and lacquers. Ester gum produced by steam distillation is used in chewing gum.

Since ester gum is not produced in Canada, the Canadian market is supplied by imports, largely from the U.S.A. The paint industry appears to be the largest single user.

Consumption of Ester Gum by the Paint Industry, 1957-63

	'000 lb.	\$'000	\$/lb.
1957	1,496	263	.18
1958	1,600	302	.19
1959	1,575	312	.20
1960	1,402	294	.21
1961	1,186	285	.24
1962	1,142	284	.25
1963	859	232	.27

Source: D.B.S., Cat. No. 46-210

Imports from the U.S.A. were about 3.5 million pounds per year for most of the seven years prior to 1964. There were no known imports from countries entitled to the B.P. Tariff.

⁽¹⁾ Transcript, Vol. 127, p. 18930

U.S. Exports of Ester Gum to Canada, 1957-64

	'000 lb.	\$'000	\$/lb.
1957	3,414	768	.22
1958	3,700	822	.22
1959	3,675	825	.22
1960	3,041	756	.25
1961	3,198	857	.27
1962	4,248	1,188	.28
1963	3,373	840	.25
1964	3,866	931	.24

Source: U.S. Department of Commerce, Bureau of the Census, U.S. Exports

The U.S. price for ester gum in carload quantities, delivered, was quoted at 20 cents per pound for the last two years and for the first quarter of 1965.(1)

Tariff Considerations

Ester gums and other materials of heading 39.05 are entered principally under the following items:

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured Nation Tariff</u>
901(a) Synthetic resins without admixture, including scrap or waste:		
7. Resins derived from natural resin or tall oil, n.o.p.	Free	Free
(b) Synthetic resins in the form of aqueous emulsions, aqueous dispersions or aqueous solutions, without admixture:		
7. Resins derived from natural resin or tall oil, n.o.p.	Free	Free
(c) Synthetic resins in organic solvents where the solvent is not more than 60 per cent by weight, without other ad- mixture:		
4. Resins derived from natural resin or tall oil, n.o.p.	12½ p.c.	12½ p.c.

There were six submissions on various materials which either fall under heading 39.05 and are classified under the present plastics schedule or are classified under the present plastics schedule but, as rosin or similar materials, fall under other headings such as 38.08.

(1) Oil, Paint and Drug Reporter

The Canadian Paint Varnish and Lacquer Association requested that ester gum be entitled to duty-free entry under both B.P. and M.F.N. Tariffs. The Association indicated that ester gum is not made in Canada and is entered under item 901(a)7, free of duty.⁽¹⁾ It was stated that the words "ester gum" have been more generally applied to glycerol ester of rosin without admixture, listed in the Industry Committee's record of proposed rates as an exception to the heading rates and for which duty-free entry was recorded.

Harrisons & Crosfield (Canada) Ltd. recommended that rosin esters and esters of modified rosins continue to enter Canada free of duty under tariff item 901(a)7, except when they contain solvent, and that those products containing solvent should continue to enter under item 901(c)4 at 12½ p.c., under both B.P. and M.F.N. Tariffs. These rates were said to seem "reasonable". The company also stated that if the materials for which it proposed free entry, were ruled to be made in Canada, its recommendations would be reconsidered.⁽²⁾ The company's interest centered on the following materials of heading 39.05.

Rosin Esters and Esters of Modified Rosins

Ester Gum 8L
Ester Gum 8D
Vinsol Ester Gum
Abalyn
Hercolyn D

Hercolyn
Pentalyn A,C,H and K
Poly-pale Ester 1 and 10
Staybelite Ester 3, 5 and 10

Apparently all these materials are imported under item 901(a)7 and are classified to B.T.N. 39.05. They were said to be a series of resins produced by reacting rosin, or a modified rosin, with methyl alcohol or a polyhydric alcohol such as ethylene glycol, diethylene glycol, triethylene glycol, glycerol or pentaerythritol. The simplest ester was said to be methyl ester of rosin and its hydrogenated derivatives.

Ester Gum 8D is a glycerol ester of rosin purified by steam distillation and used in chewing gum; Ester Gum 8L, a glycerol ester of rosin, is used in adhesives, paints and varnishes; Vinsol Ester Gum, glycerol ester of a dark hydrocarbon-insoluble pine wood resin, is used in lacquers; Abalyn, methyl ester of rosin, is used in paints; Hercolyn D, hydrogenated methyl ester of rosin purified by steam distillation, is used in chewing gum; Hercolyn, hydrogenated methyl ester of rosin, is used in adhesives, inks and lacquers; Pentalyn, pentaerythritol ester of rosin, is used principally in adhesives, paints and inks; Poly-pale Ester 1, ethylene glycol ester of polymerized rosin, is used in adhesives; Poly-pale Ester 10, glycerol ester of polymerized rosin, is used also in adhesives; Staybelite Ester 3, triethylene glycol ester of hydrogenated rosin, is used in adhesives; Staybelite Ester 5, glycerol ester of hydrogenated rosin purified by steam distillation, is used in chewing gum; Staybelite Ester 10, glycerol ester of hydrogenated rosin, is used in adhesives.

(1) Transcript, Vol. 161, p. 23927

(2) Same, Vol. 161, p. 23880-1

Minnesota Mining and Manufacturing of Canada Limited requested that modified pentaerythritol ester of rosin now entered under item 901(a)7 and classified under B.T.N. heading 39.05 be permitted duty-free entry until it is made in Canada, and at that time it be dutiable at 15 p.c., B.P. and 20 p.c., M.F.N.(1) Further, in a letter addressed to the Board on October 30, 1964, the company requested that limed rosin, a hardened rosin obtained by treatment with lime, ruled by the Department of National Revenue as a synthetic resin entitled to entry under item 901(a)7, be classified under B.T.N. 39.05 free of duty until such time as it is made in Canada.(2) Under the B.T.N., this product might be regarded as a derivative of rosin under heading 38.08. Considerable discussion took place at the hearing on the distinction of products classified by headings 39.05 and 38.08. The company's submission is dealt with under heading 38.08.

Reichhold Chemicals (Canada) Limited supported the Industry Committee's proposal for a heading rate of 15 p.c., B.P. and 20 p.c., M.F.N. for B.T.N. 39.05.(3) The company's intention was said to be to manufacture resins generally falling under tariff item 901(a)7, especially glycerine and pentaerythritol esters of rosin and other modified rosin esters. However, none of these has been ruled made in Canada.

Respecting a submission by Schenectady Varnish Canada Limited, mention was made of modified natural resins such as run gums and ester gums, classified under B.T.N. heading 39.05. However, the company's modification of this type of materials was said to be beyond the modification defined in heading 39.05. It was said to be more than fusion and esterification and, therefore, the products would likely be classified under B.T.N. 39.01.(4)

The Canadian Paint Varnish and Lacquer Association pointed out that various rosin derivatives such as dimerized rosin, polymerized rosin, hydrogenated rosin and hydrogenated methyl ester of rosin are entered under item 901(a)7, and that they are classified under B.T.N. 38.08.(5) However, hydrogenated methyl ester of rosin would be classified under B.T.N. heading 39.05. The Association indicated that these materials are valuable to the paint manufacturers and because they are not available in Canada, the Association requested duty-free entry for them under the appropriate heading.

The Rubber Association of Canada, in its general brief opposing any increases of duties on plastics materials used by its members, listed as such resins derived from natural resins.(6)

The Industry Committee proposed a residual provision for rates of 15 p.c., B.P., 20 p.c., M.F.N. for heading 39.05.

(1) Transcript, Vol. 162, p. 24088

(2) Same, Vol. 162, p. 24096

(3) Same, Vol. 126, p. 18862

(4) Same, Vol. 127, p. 18942

(5) Same, Vol. 161, p. 23922

(6) Same, Vol. 123, p. 18404

Synthetic Chewing Gum Base

Although the exact nature of synthetic chewing gum base was not disclosed, the material was said to be dutiable under tariff item 904a, and there was one submission on chewing gum base under B.T.N. heading 39.05.

Chewing gum base was described as consisting of compounds in chief part synthetic resins which fall under the present end-use tariff item 904a which was established by Order-in-Council, effective July, 1954 and continued since that time.⁽¹⁾ This material was said to be similar to natural gum, in particular to chicle and to be widely used in the manufacture of chewing gum. Chewing gum base is not made in Canada and is imported largely from the U.S.A. Data on exports from the U.S.A. to Canada of chicle and natural gum bases and compounds are given in the following, though it is not known to what extent these would include the compounds of tariff item 904a, imports of which are understood to be fairly substantial compared to these reported data.

U.S. Exports of Chicle and Other Natural Chewing Gum Bases Including Compounds to Canada, 1958-63

	<u>'000 lb</u>	<u>\$'000</u>	<u>\$/lb</u>
1958	1,921	873	.45
1959	2,078	960	.46
1960	2,290	1,120	.49
1961	2,468	954	.39
1962	2,286	940	.41
1963	1,946	839	.43

Source: U.S. Department of Commerce, Bureau of the Census, U.S. Exports

Adams Brands Ltd. said that it was purchasing the synthetic materials directly from its parent company, the American Chicle Company, Long Island, New York.⁽²⁾

Import competition in the Canadian market for chewing gum was said to be very little; Adams Brands and Wm. Wrigley, Jr., Co. Limited, Don Mills, Ont., were estimated to have 75 to 80 per cent of the Canadian market for chewing gum; other producers in Canada supply part of the remainder of the market. Adams Brands was said to export some chewing gum to Britain, Fiji Islands and the West Indies.

Tariff Considerations

Chewing gum base is imported under tariff item 904a, "Compounds, n.o.p., consisting in chief part of synthetic resins, for use in the manufacture of chewing gum, 5 p.c., B.P. and 5 p.c., M.F.N."

⁽¹⁾ Transcript, Vol. 161, p. 23829

⁽²⁾ Same, Vol. 161, p. 23865

Adams Brands Ltd. requested that item 904a be retained in its present form and with the present rates of duty. The company stated:

"The problems, difficulties and complexities that are involved in the production of base to maintain its qualities and characteristics unwavering in any respect embrace, of course, operation in the United States of the parent company from whom we purchase our supplies; and we would urge and submit that for the reasons aforementioned, including and in particular the analogy to natural gum, that the item should be continued."(1)

The natural gums are understood to be admissible duty-free under tariff item 254(4). This item is not in Reference 120.

Concern over the type of materials included in tariff item 904a was shown at the public hearing. The spokesman for the Canadian Paint Varnish and Lacquer Association indicated that the type of materials used in chewing gum might be similar to, or the same type as, those used by manufacturers of adhesives, waxes and other articles, and also to products which Reichhold Chemicals has the intention of manufacturing in Canada and the types of products manufactured by Schenectady Varnish.

Shawinigan Chemicals was concerned about the scope of the wording of tariff item 904a. The spokesman for Shawinigan Chemicals said:

"polyvinyl acetate resin has been and is used in some gum formulations, and perhaps if their item, in fact, does contain essentially the glycerol esters of hydrogenated resin and chicle, if these are the main components, perhaps the item should be worded in such a way as to narrow it down to something of this nature, as long as it is not made in Canada because 'compounds' is a pretty broad term and might cover a multitude of material."(2)

(1) Transcript, Vol. 161, p. 23838

(2) Same, Vol. 161, p. 23870

OTHER HIGH POLYMERS, ARTIFICIAL RESINS AND ARTIFICIAL
PLASTIC MATERIALS, INCLUDING ALGINIC ACID,
ITS SALTS AND ESTERS; LINOXYN - B.T.N. 39.06

B.T.N. heading 39.06 applies to high molecular weight polymeric substances that are not included in the preceding headings of Chapter 39. Some are substances that have been isolated from natural materials such as lignin from wood, heparin from animal tissues and linoxyn from linseed oil. None of these products is classified under the plastics Schedule in the Canadian Customs Tariff. Linoxyn is entered under tariff item 277 which is not in reference 120.

Starches modified by etherification or esterification are also classified in heading 39.06. Etherified starches include those containing hydroxyethyl, hydroxypropyl or carboxymethyl groups. Esterified starches include starch acetates used primarily in the paper or textile industries and starch nitrates (nitrostarch) used in the manufacture of explosives and entered under item 666 in the Customs Tariff.

Alginic acid, extracted from sea weed, and its alkali metal salts and esters such as propylene glycol alginate are also classified in the present heading.

Apart from lignin resins, heparin and alginates, for which the Board received submissions, the materials of the heading do not appear to be of great commercial significance in Canada. Both heparin and salts of alginic acid are made in Canada.

LIGNIN RESINS

The Canadian Pulp and Paper Association, in its general brief opposing increases in duties on materials used by its members, included as such lignin resins used in the manufacture of hardboard, to the amount of \$115,000 in 1958.⁽¹⁾ These materials are classified under Tariff item 203, free of duty under all Tariffs.

HEPARIN SODIUM

This material is generally referred to as "heparin". The U.S. Pharmacopeia refers to it as "heparin sodium". Heparin calcium and heparin potassium are also referred to in industry as heparin, but are of minor commercial importance. Heparin is a sodium salt of a complex organic acid present in mammalian tissues and has the property of prolonging the clotting time of blood. It is a white or pale amorphous powder, chemically considered to be a polymer but not used as such, and derived from animal livers or lungs. Heparin sodium is almost entirely used in medicine as an anticoagulant.

⁽¹⁾ Transcript, Vol. 129, p. 19359; Vol. 130, p. 19386

This material is made in Canada by Fine Chemicals Division of Canada Packers Limited at its plant in Toronto, Ont. Since there is only one manufacturer of heparin in Canada, plant capacity, output and other statistical data are confidential. However, the company was said to sell the material in bulk form to pharmaceutical manufacturers and also in packages on custom basis. In its basic use, heparin appears to compete advantageously with dicoumarol, a synthetic compound.

Imports were said to be coming largely from the U.S.A. and Britain. The latter seems to import crude heparin from South America. Imports of heparin sodium were valued at \$80,000 in 1956 and about \$70,000 in 1962. None appears to have been reported separately in 1963. Some of the imports of heparin were said to be in bulk to be packaged in Canada.

Imports of Heparin Sodium, 1956-62

	<u>\$'000</u>
1956	80
1957	45
1958	50
1959	80
1960	90
1961	80
1962	70

Source: Department of Trade and Commerce, Chemical Import Trends

Apart from supplying part of the domestic market, the Canadian manufacturer was said to export heparin to various countries.

The price of heparin was said to be approximately \$1.40 to \$1.50 for each 100,000 units, approximately one gram. The prices in the world market were represented as being within 10 cents variation of that.

Tariff Considerations

Heparin sodium is imported under tariff item 711, at rates of duty of 15 p.c., B.P., 20 p.c., M.F.N. When used as an anticoagulant for human blood, heparin sodium, in containers, may be entered duty-free under tariff item 206c(1), or if for use in the manufacture of anticoagulants, in containers, under item 206c(2); heparin in bulk, extracted from animals glands, may be entered duty-free under item 206d. Tariff items 206c(1), 206c(2) and 206d are not within the Board's terms of Reference.

There were two submissions made to the Board by Canada Packers Limited. In the first, the company requested the maintenance of the present duty rates of item 711, 15 p.c., B.P. and 20 p.c., M.F.N. under a proposed item like B.T.N. heading 39.06.⁽¹⁾ In the

⁽¹⁾ Transcript, Vol.161, p. 23955

second, the company was concerned with the use and interpretation of item 206d under which heparin, in bulk, is imported into Canada duty-free. It was further stated that the company proposed to the Department of Finance an amendment to item 206d to remove the phrase "and extracts thereof, wet or dry, (whether alcoholic or not)" which, according to the company "would eliminate the possibility of the many and various products which can be found in animal glands being imported free of duty".⁽¹⁾ The spokesman for the company claimed that protection is provided only for the finished product under item 711 and that there is no protection from imported bulk heparin.

Canada Packers appears to have sufficient productive capacity to supply the Canadian market. However, a large portion of the market seems to be supplied by imports which might be coming under duty-free items such as 206c(1), 206c(2) and 206d.

The Canadian Pharmaceutical Manufacturers Association included heparin sodium among the more important materials used by its members for which end-use treatment was requested, with suggested rates of Free, B.P., 15 p.c., M.F.N., for those not made in Canada and of 15 p.c., B.P., 20 p.c., M.F.N., for those made in Canada.⁽²⁾

ALGINIC ACID AND ITS DERIVATIVES

Alginic acid is a polymer of the beta-anhydro-d-mannuronic acid present in algin. "Algin" is used to refer to alginic acid and its derivatives such as sodium alginate, potassium alginate, ammonium alginate, calcium alginate and propylene glycol alginate, an ester of alginic acid.

Alginic acid is a white to dark brown powder with marked hydrophilic colloidal properties, soluble in water but insoluble in organic solvents. It is extracted from the giant kelp which grows off the coast of Southern California and from rockweed found along the shores of Nova Scotia. Alginic acid reacted with salts results in the various derivatives; in a reaction with propylene oxide the ester, propylene glycol alginate is formed. These materials appear to be closely related to natural gums in chemical and physical properties.

Of all alginic materials, only the salts are manufactured in Canada. Although alginic acid is produced as an intermediate in the manufacture of the salts, it is not made in Canada as a finished product.

These materials are widely used as stabilizers, thickeners, binders, film formers, paper sizes and jelling agents. Algins are used in the manufacture of ice cream and other dairy products, dressings, puddings, bakery products and beer. Other uses include the manufacture of pharmaceutical products and in paper and textile printing. Algins are often used as a replacement for, and claimed to be an improvement over, gelatin and gums such as tragacanth, karaya,

(1) Transcript, Vol. 172, p. 28284

(2) Same, Vol. 87, p. 13304, 13308

acacia, locust bean gum and seaweed products such as Irish moss and agar-agar.

Salts of alginic acid, including sodium alginate, potassium alginate, ammonium alginate and calcium alginate, are manufactured at Lower Wood Harbour, Nova Scotia by Scotia Marine Products Limited, a wholly-owned subsidiary of the Kelco Company, U.S.A. The company, formed in 1959, produces alginate salts by extracting alginic acid from rockweed available on the shores of Nova Scotia and reacting the acid with the specific salt to produce the alginate. The company does not produce either alginic acid to be used as an end-product or certain of the sodium and potassium alginate products of a fibrous nature; neither does it produce the propylene glycol ester of alginic acid.(1)

Natural gums, which are not made in Canada, were said to compete with algin, as do certain materials classified under B.T.N. 39.03 such as carboxymethyl cellulose, hydroxyethyl cellulose and methyl cellulose. The last seems to compete with salts of alginic acid in the fields of paints, resin emulsions and synthetic rubber emulsion.

Since there is only one producer of these materials, published data on production and market are not available. However, it was asserted at the public hearing that one third of the potential market for alginates in Canada was supplied by imports from Britain, Norway and France. On the other hand, the company was said to import for resale alginic acid, its salts and esters from its parent company in the U.S.A. which was considered to be "the sole manufacturer of alginates in the U.S.A. for all practical purposes."(2)

Imports of propylene glycol alginate were estimated at about \$200,000 in 1962, but only \$50,000 in 1963. If imports of alginic acid and its salts were added, total imports probably would be significantly more. Some of these imports include mixtures of salts or esters of alginic acid with gums or with sugar which might not be classified in heading 39.06.

Tariff Considerations

Alginic acid, its salts and esters, are imported principally under tariff items 141, 208t, 216 and 254(4). Of these, only items 208t and 216, under which propylene glycol alginate and alginic acid respectively are entered, are within the terms of Reference 120. Both items provide rates of duty of Free, B.P., 15 p.c., M.F.N., for products of a kind not made in Canada. It is unlikely that any imports under tariff item 141 would be a form of alginic acid classified by heading 39.06 of the B.T.N.; item 141 is not in Reference 120.

(1) Transcript, Vol. 162, p. 24019

(2) Same, Vol. 162, p. 24046-7

<u>Item</u>	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
141 Sugar candy and confectionery, n.o.p., including sweetened gums, candied popcorn, candied nuts, flavouring powders, custard pow- ders, jelly powders, sweetmeats, sweetened breads, cakes, pies, puddings and all other confections containing sugar GATT	12½ p.c.	22½ p.c.
208t All chemicals and drugs, n.o.p., of a kind not produced in Canada	Free	15 p.c.
216 Acids, n.o.p., of a kind not pro- duced in Canada GATT	Free	15 p.c.
254 Gums, namely: (4) Gums and blends consisting wholly or in chief part of gums, n.o.p.	Free	Free

There was one submission, by Kelco Company, which proposed:

- (1) The deletion of Group Heading 39.06 as written in the Brussels Nomenclature:
- (2) Substitution therefor of the following:

39.06 Alginic acid, its salts and esters, when not made in Canada,
Free, B.P., Free, M.F.N.

When made in Canada, 15 p.c., B.P., 20 p.c., M.F.N.

Sub-group 1: Other high polymers, artificial resins and
artificial plastic materials, including linoxyn,
when not made in Canada
B.P.... M.F.N....

When made in Canada
B.P.... M.F.N....

The company did not propose rates of duty for sub-group 1.⁽¹⁾

At the public hearing, the spokesman for Kelco Company re-
quested that "the Board follow whatever procedure is necessary and
favourably consider adding item 254(4), insofar as it relates to salts
of alginic acid, to Reference 120."⁽²⁾ This would permit those made
in Canada to be dutiable under heading 39.06 at rates of 15 p.c.,

(1) Transcript, Vol. 162, p. 24017

(2) Same, Vol. 162, p. 24060

B.P., 20 p.c., M.F.N. There was a suggestion to keep B.T.N. heading 39.06 in its present form at rates of 15 p.c., B.P. and 20 p.c., M.F.N. and to provide exceptions for materials not made in Canada such as alginic acid and propylene glycol alginate for which duty-free entry could apply.

In regard to competitive materials such as carboxymethyl cellulose, hydroxyethyl cellulose, methyl cellulose, gum tragacanth, gum arabic, guar gum and locust bean or carob bean gum, the company, in order that algin products may compete equally with these products, suggested that the rates of duty on these products should not be less than those applicable to algin products.⁽¹⁾ Kelco Company indicated that Scotia Marine Products Limited is the only manufacturer in Canada of algin products and that it is facing heavy competition from algin products of overseas origin.

There are no algin products known to be made in Canada which, if imported, would fall under tariff items referred to the Board; only materials not made in Canada, such as alginic acid and propylene glycol alginate, would be entered under tariff items referred to the Tariff Board.

The Canadian Pharmaceutical Manufacturers Association included alginic acid and sodium alginate in a list of materials used by its members for which end-use treatment was requested, with suggested rates of Free, B.P., 15 p.c., M.F.N. for those not made in Canada and of 15 p.c., B.P., 20 p.c., M.F.N., for those made in Canada.⁽²⁾

The Canadian Pulp and Paper Association, in its general brief opposing increases in duties on materials used by its members, listed as such sodium alginate used in surface sizing solutions and extensively in boxboard mills on calender stacks.⁽³⁾

The Industry Committee made a residual proposal for rates of 15 p.c., B.P., 20 p.c., M.F.N. for heading 39.06.

(1) Transcript, Vol. 162, p. 24020

(2) Same, Vol. 87, p. 13304

(3) Same, Vol. 129, p. 19359

39.07 -- ARTICLES OF MATERIALS OF THE KINDS
DESCRIBED IN HEADINGS 39.01 to 39.06

General Considerations

In the Brussels Nomenclature this heading is residual in nature, covering a wide range of plastics products varying from semi-finished forms further advanced than those provided for in headings 39.01 to 39.06, to all the finished plastics products not more specifically provided for elsewhere in the Nomenclature. In effect, therefore, it corresponds to the items in the existing Canadian Tariff Covering the not-otherwise-provided-for manufactures of the various forms of artificial resins and plastics, though the correspondence is by no means exact.

The firms producing manufactured plastics products may be said to constitute the secondary plastics industry but, because there are many companies whose production of plastics constitute only a part of their overall operations, it is difficult to establish any exact industry. A spokesman for the industry, while stating that the "Plastics Directory" current at the time of the hearing, listed 568 processing firms,⁽¹⁾ suggested that more than 1,100 concerns in Canada do some plastics processing. There were said to be about 245 firms which might be described as moulders, extruders, high pressure laminators, plastics film producers and converters, reinforced plastics fabricators and producers of plastics articles, while more than 800 other firms in various industries process plastics in boat-building, in the manufacture of rubber products, toys and games, brushes, brooms and mops and in the production of electrical products including wire and cable, of telephones and automobile parts and accessories.⁽²⁾

The secondary plastics industry was said to be concentrated in Ontario and Quebec, but also to be important in British Columbia and Alberta; in general, it is located close to important markets. Employment was estimated at approximately 15,600.⁽³⁾ Sales were said to be confined largely to the domestic market and to present the difficulties inherent in serving a restricted market scattered in pockets along a 3,000-mile border.

In a more specific submission to the Board, the Moulders and Extruders Division of the Society of the Plastics Industry suggested that its branch of the industry in 1961 comprised some 257 firms, employing 7,300 people, with annual sales of \$90 million and annual consumption of plastics materials of \$32.8 million. These companies use processes such as compression and transfer moulding, injection moulding, extrusion, vacuum forming, heat sealing, rotational casting and blow and foam moulding to make products ranging from "buttons to ballistic missile components, radio and refrigerator parts."⁽⁴⁾ They make use of all types of resins in such forms as pills, granules, sheets, pastes, liquids and expandable pellets.

⁽¹⁾ Transcript, Vol. 121, p. 18164

⁽²⁾ Same, Vol. 121, p. 18165

⁽³⁾ Same, Vol. 121, p. 18166

⁽⁴⁾ Same, Vol. 124, p. 18503-4

The Reinforced Plastics Division of the Society suggested that there were about 150 firms in that branch of the industry.⁽¹⁾ It was also suggested that there would be little duplication in firms between the moulders and extruders and the reinforced plastics fields.

The Dominion Bureau of Statistics publishes an annual report on plastics fabricators not classified specifically to any other industry. The list of firms covered by the relevant statistics was altered in 1960 with the introduction of the "Revised Standard Classification and New Establishment Concept", and revised figures on the new basis were published back to 1957. The growth of the industry may be seen in the following table:

Principal Statistics of the Plastics Fabricators, n.e.s.,
Selected Years, 1947-63

	<u>Establishments</u> no.	<u>Employees</u> no.	<u>Value of Shipments</u> \$'000
1947	81	2,503	12,716
1952	143	3,700	33,585
1957 (old basis)	195	4,728	59,840
1957 (new basis)	180	4,194	52,342
1960	249	6,293	88,345
1961 (a)	277	7,973	108,992
1962	295	8,527	128,947
1963	299	9,345	145,358

(a) A further small change in classification occurred in 1961; the data for 1961, 1962 and 1963 are on the new basis

Source: D.B.S., Catalogue No. 47-208

In 1962, just over half the establishments, producing nearly 60 per cent of the output, were located in Ontario. Quebec had 28 per cent of the establishments and about one-third of the output.

A trade publication provides annual estimates of data for the plastics industry, divided between those for the primary plastics and synthetic resins and those relating to plastics fabricators that constitute the secondary plastics industry. In 1964, there were said to be 310 fabricators and some 1,100 firms in other industries engaged in the manufacture of plastics products. The combined figures for the secondary plastics industry for the last three years are:

(1) Transcript, Vol. 163, p. 24187

Secondary Plastics Industry

	<u>1962</u>	<u>1963</u>	<u>1964</u>
	- million dollars -		
Canadian Production	282	315	340
Imports	93	96	104
Total Sales	375	411	444

Source: Canadian Plastics, March 1964, March 1965

No estimates of exports are available, but these are believed to constitute only a small part of total sales.

Imports and exports of plastics products are divided by the D.B.S. among a wide range of classes and no meaningful totals for this study, can be derived from official sources.

Tariff Considerations

A number of tariff items in Reference 120 relate wholly or in part to manufactured plastics products. These include the following:

	<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>	<u>General Tariff</u>
326d Beads, drops or other shapes of glass or cellulose acetate, when imported by manufacturers of imitation pearls, for use exclusively in the manufacture of such articles in their own factories	Free	Free	Free
326f Moulded illuminating shades, reflectors and refractors of glass, of synthetic resins, of pyroxylin, or of plastics of cellulose acetate or other chemical derivatives of cellulose, of a class or kind not made in Canada, designed for use with lighting fixtures or with portable lamps	Free	15 p.c.	32½ p.c.

		<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>	<u>General Tariff</u>
326q	Beads, drops or other shapes of synthetic resins, for use in the manufacture of imitation pearls (Expires 31st October, 1966)	Free	Free	30 p.c.
577	Collars and cuffs manufactured from cellulose plastics with or without cotton interlining	Free	20 p.c.	25 p.c.
654a	Pins or pegs of synthetic resin used as bristles in the manufacture of brushes	Free	5 p.c.	20 p.c.
658b	Video tape, n.o.p.	15 p.c.	20 p.c.	30 p.c.
660a	Synthetic resin or cellulose plastic sheets or plates, coated or not, with or without turned edges, for the production of engravings for use by printers	Free	7½ p.c.	30 p.c.
660b	Plates, curved or not, consisting of a layer of cellulose plastic composition and metal, coated or not, for the production of printing plates (Expires 31st October, 1966)	10 p.c.	10 p.c.	30 p.c.
663b	Articles which enter into the cost of the manufacture of fertilizers, when imported for use exclusively in the manufacture of fertilizers	Free	Free	Free
711	All goods not enumerated in this schedule as subject to any other rate of duty, and not otherwise declared free of duty,...	15 p.c.	20 p.c.	25 p.c.
791	Materials of all kinds for use in producing or manufacturing preparations provided for in tariff items 209b and 219a under such regulations as the Minister may prescribe	Free	Free	Free

		<u>British Preferential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>	<u>General Tariff</u>
908	Manufactures of synthetic resins including floor or wall tile containing synthetic resin, n.o.p.	15 p.c.	20 p.c.	30 p.c.
915	Manufactures of cellulose plastics, n.o.p.:-			
	(a) Cellulose nitrate	10 p.c.	20 p.c.	30 p.c.
	(b) Cellulose nitrate cine-matograph and moving picture films, negatives, n.o.p.	10 p.c.	10 p.c.	20 p.c.
	(c) Other	15 p.c.	20 p.c.	30 p.c.
916	Laminated moulded plastics products, n.o.p., having synthetic resins or cellulose plastics as the chief bonding (impregnating) agents	15 p.c.	15 p.c.	25 p.c.
918(c)	Manufactures of regenerated cellulose, n.o.p.	15 p.c.	20 p.c.	30 p.c.
920	Manufactures of protein plastics, n.o.p.	15 p.c.	20 p.c.	30 p.c.
*924	Aerosol valve assemblies and parts thereof for use in Canadian manufactures (Expires 31st October, 1966)	Free	Free	30 p.c.
924b	Cast phenolic resin handles, in the rough, for use in the manufacture of cutlery (Expires 31st October, 1966)	7½ p.c.	7½ p.c.	30 p.c.

*This item is not part of Reference 120.

Although tariff items 660a and 660b are within Reference 120, the Board has dealt with them under Reference 133, Printing Machinery and Apparatus, in which they are also included.⁽¹⁾

Heading 39.07, taken in the context of the entire Brussels Nomenclature, would apply to many goods now provided for by tariff items not within the scope of Reference 120 and would by no means cover all the manufactured plastics products now classified under the relevant existing items referred to the Board. Problems also arise out of differences between the Nomenclature and the existing Tariff as to the dividing lines between primary and further manufactured forms of synthetic resins and plastics. It was suggested by the Industry Committee that an item worded like heading 39.07, in the context of the entire Canadian Customs Tariff, would tend to approximate closely the existing items for manufactured products that had been referred to the Board.(1)

The proposals made to the Board may be divided between those relating to the heading as a whole and those for specific manufactured plastics products. Many of the recommendations were directly related to rates proposed under headings 39.01 to 39.06 for the raw materials of the fabricating industry. In its compilation of rate proposals, the Industry Committee included rates of 25 p.c., B.P. and 30 p.c., M.F.N.; these were said to be the rates recommended for the heading by certain manufacturers of products under the heading.(2)

The principal resin producers who proposed rates for the heading were Canadian Industries Limited (C.I.L.), Shawinigan Chemicals and Monsanto Canada Limited. C.I.L.'s proposal was for a heading rate of 30 p.c., under the M.F.N. Tariff.(3) The company stated that it favoured heading rates the same as the rates it was recommending for its own products under the headings, although it did not oppose other rates on non-competitive products. The proposal for heading 39.07 was, as will be discussed later, subsequently modified. Shawinigan endorsed the rates of 25 p.c., B.P. and 30 p.c., M.F.N., for products made from polyvinyl chloride. This proposal would cover all goods made from 100 per cent polyvinyl chloride resins or from copolymers containing more than 50 per cent of polyvinyl chloride, including such products as raincoats, baby pants, etc. The company stated that it does not manufacture products of heading 39.07, but that the proposed rates were "reasonable in light of other proposals" such as the 30 p.c. for decorated film under heading 39.02.(4) The company pointed out that vinyl floor tile would go from tariff item 908 to heading 39.02, and that its estimated imports of all goods, including those of resins other than polyvinyl chloride, under item 908, to be about \$30 million annually. Monsanto stated that it supported the rates proposed under 39.07, namely 25 p.c., B.P. and 30 p.c., M.F.N., in so far as they relate to products made from polyvinyl chloride.(5) While the company makes a few products that might fall under the heading, it does not consider these to be a significant proportion of its plastics production. It suggested however that "the rates proposed on the fabricated products,...taking into account the value of these products, is sufficient to provide each step with the protection which is desirable."(6)

(1) Transcript, Vol. 162, p. 24067, 24078

(2) Same, Vol. 121, p. 18064

(3) Same, Vol. 132, p. 19739

(4) Same, Vol. 151, p. 22405, 22512

(5) Same, Vol. 153, p. 22676

(6) Same, Vol. 153, p. 22736

The most detailed submission relating to fabricated plastics products came from the Moulders and Extruders Division of the Society of the Plastics Industry. This was expressed in terms of the B.T.N.; free entry was proposed for all resins and compounds under headings 39.01, 39.02 and 39.03, and rates of 30 p.c., B.P. and 40 p.c., M.F.N. were proposed for heading 39.07.⁽¹⁾ The group further suggested that if rates were applied to resins, the rates on the further processed forms and products should be at least 30 percentage points higher than those on the primary materials. The discussion of the proposals made it clear that the rates proposed for heading 39.07 were intended to apply also to certain products that would remain under headings 39.01, 39.02 and 39.03; fabricated plastics were considered to include anything moulded, extruded, formed or in any other way worked from the resins and compounds. In effect, free entry was proposed for goods now classified under tariff items 901, 902, 904, 909, 910, and 911. Almost all other items in the existing plastics schedule would attract the proposed higher rates. Imports of plastics manufactures were variously estimated at \$30 million and \$57.6 million in 1961.

The firms based their case on the need to improve their profit position, pointing out that a survey of 107 firms in 1957 and of 132 firms in 1961 had indicated a drop of average profits to sales from 4.2 per cent to 3.9 per cent and an average return on investment from 9.1 per cent to 6.8 per cent.⁽²⁾ The year 1961, of course, witnessed a reduction in average profits for many other industries as well. The companies in this field produced some \$90 million worth of goods annually, using \$22.7 million dollars of plastics raw materials, of which nearly 70 per cent were reported to be obtained from Canadian sources, and almost all of the remainder from the U.S.A. More than one-half of the imports were said to be due to unavailability of materials in Canada and the balance due to price or other factors. The need to reduce costs of materials led to the proposed free entry for materials and, it was suggested, there was a need for a differential of at least 30 per cent for fabricated products.

The major problem of the firms in this field was said to be costs of moulds, which have to be amortized over runs only 5 to 10 per cent of the length of runs in the U.S.A., even though finished products have to be sold at prices equivalent to U.S. prices. Higher material costs, it was admitted, tend to be offset by lower labour costs in Canada. The moulders and extruders suggested that their proposals were designed to produce a return of 10 to 15 per cent on investment, to protect employment and enable expansion of the industry to meet the potential market of \$150 million annually. Exports were said to be small, about \$1.5 million annually, in fields where price disadvantage could be offset by differences in design and application. It was also suggested that other countries, such as the U.S.A., had rates of duty on plastics products similar to those proposed for Canada.

(1) Transcript, Vol. 124, p. 18511-3

(2) Same, Vol. 124, p. 18508

Several members of the Moulders and Extruders Division registered objections to the proposals, although most of these appear to have been overcome by an amendment to the proposals made at the time of the hearing. However, one firm, Industrial Plastics Extrusion Company Limited, disassociated itself completely and stated its support for the rate structure put forward by the Industry Committee.⁽¹⁾

A number of resin producers made comments on the proposals. C.I.L. opposed free entry for the resins and accepted, without supporting it, the proposed 30 p.c. differential.⁽²⁾ The company felt that the rates on finished products should be high enough to reduce imports and increase the share of the Canadian market held both by resin producers and by manufacturers of moulded and extruded products. Du Pont of Canada also disagreed with free entry for materials, but stated that it supported "equitable tariff treatment...on products made from plastic resins by moulders, extruders or film converters."⁽³⁾ It was observed that the sales of resin by the producers depend on their customers' ability to sell final products. Dow Chemical of Canada Limited commented that a healthy plastics industry needs a healthy fabricating industry and vice versa.

As part of its proposed over all tariff structure for resins and plastics, Paisley Products of Canada Limited suggested that a rate of 15 p.c., B.P. and M.F.N. should apply to heading 39.07, with rates of 7½ p.c., under both Tariffs, for goods of a class or kind not made in Canada. The company advanced no arguments relating specifically to heading 39.07.

Many parties which opposed increases or asked for reductions in the rates on plastic materials also commented on the rates proposed for heading 39.07. In summary, these suggested that increased rates on products would be needed if rates on resins were increased, although many of them pointed out that this would tend to reduce the competitive position of plastics goods in relation to those made from other materials.

The Rubber Association of Canada, which proposed that there be no change in the present tariff structure for plastics, stated that the proposed increase for manufactured goods to 25 p.c., B.P. and 30 p.c., M.F.N., was not acceptable as an offset to proposed increases on resins because these rates would not assist the manufacturers of plastics in their competition with non-plastic products, nor did it take into account goods, such as footwear, coated fabrics, gloves, etc., which are more specifically provided for in the Customs Tariff under items not included in the Reference.⁽⁴⁾

Thermoset Plastics Limited and a number of other companies in their joint submission asking that duties on phenolic moulding compounds be reduced or removed, pointed out that, in 1961, about \$72 million worth of mouldings were imported from the U.S.A.⁽⁵⁾

(1) Transcript, Vol. 124, p. 18516

(2) Same, Vol. 124, p. 18518

(3) Same, Vol. 124, p. 18519

(4) Same, Vol. 123, p. 18397

(5) Same, Vol. 127, p. 19049

Not all of these products are at present classified under items covering plastics manufactures. If the tariff on moulding materials were increased, then the tariff on finished mouldings would also need to be increased to protect the Canadian moulder from the effect of price increases imposed by the Canadian suppliers. This, however, would not offset the loss of service and technological advice from foreign suppliers nor serve the need of keeping raw material costs down to offset mould costs and to avert the import of finished goods; the companies therefore preferred low rates on raw materials to higher rates on finished products.

A large group of fabricators which made submissions on polyvinyl chloride resins also pointed to the difficulties in obtaining higher tariff protection on their products and suggested that increased cost of materials would lead to loss of markets to imports or to alternate materials.⁽¹⁾ General Wire and Cable Limited, which formed part of this group, suggested, however, that as there was increasing Canadian labour and material content to be protected rates be higher on finished goods and proposed 30 p.c. under both Tariffs for these; on intermediate forms, such as compounds, 17½ p.c. was suggested; on the basic resins, free entry was said to be appropriate.⁽²⁾

Dominion Oilcloth and Linoleum Limited and certain associated companies,⁽³⁾ as well as The Flintkote Company of Canada Limited,⁽⁴⁾ whose products are largely under 39.02 (vinyl asbestos tile and vinyl by the yard), claimed that the present rates on products are adequate compared with rates on resins; if rates on polyvinyl chloride were increased to the proposed levels, the companies would need 25 p.c., B.P. and 30 p.c., M.F.N. on their products, as proposed for heading 39.07. They also drew attention to the existence of competitive products not within the Board's terms of reference.

Canadian-General Tower Limited requested continuation of present rates on the items with which the company is concerned, including tariff item 908.⁽⁵⁾ The company suggested that it spoke for a large number of companies converting plastics into consumer products, most of whom were concerned with particular products or markets in limited areas. No other firm of this type was said to have such a broad range of interests as Canadian-General Tower which makes consumer products in its converting division. Attention was drawn to reductions in prices of consumer goods to meet competition. Although there were said to be few imports of finished goods from the United States, Japanese raincoats had acquired more than 50 per cent of the Canadian market and two or three Canadian manufacturers had been forced out of the market. Although these imports had been put under quota, imports from Hong Kong were rising. Canadian sales had dropped 35 per cent between 1958 and 1962, despite the rising population. The Japanese product sold at 59½ cents a coat, f.o.b. Japan, which was said to be below the Canadian factory cost. In 1960, 692,000 coats had been imported from Japan and a quota for 1961 was set at 520,000. In 1962 Japan supplied 350,000 and Hong King 242,000 coats.⁽⁶⁾ The company

(1) Transcript, Vol. 154, p. 22880

(2) Same, Vol. 155, p. 22970-2

(3) Same, Vol. 156, p. 23097-8

(4) Same, Vol. 156, p. 23151

(5) Same, Vol. 156, p. 23153

(6) Same, Vol. 156, p. 23230

felt that the present protection on vinyl products was required to prevent an increasing share of the market from being taken by imports. It suggested that the present step-by-step protection had worked satisfactorily for 12 years, with all stages of the Canadian industry increasing in volume and diversification. If rates on vinyl resins were increased, the present differentials relating to stages of manufacture should be maintained.

Fingerhut International Limited claimed that the proposed rates for 39.07 would not offset the duty increases proposed for the film and sheet purchased by the company to make automotive seat covers. It was claimed that the market will not absorb price increases because of consumer resistance; the market might, therefore, decline.

Sceptre Manufacturing Company, which produces pipe fittings from acrylonitrile-styrene-butadiene resin, rigid PVC pipe and fittings, jerry cans from hi-density polyethylene, and plastic toys, wading pools, skate guards, pails, chairs, etc., suggested that if rates on resins and compounds were left unchanged, the present rates on products would be satisfactory, but that the company needs maintenance of the present relative protection on products and would want 25 p.c., B.P., and 30 p.c., M.F.N. on products if rates on raw materials were increased.⁽¹⁾

TCF of Canada Limited, in representations as a manufacturer of regenerated cellulose film under 39.03 had advocated no changes in rates, suggested also that further manufactured products, such as printed film and articles, should continue at the rates of duty at present applicable under tariff item 918(c) -- 15 p.c., B.P., and 20 p.c., M.F.N., or item 181 -- 17½ p.c., B.P. and 22½ p.c., M.F.N.⁽²⁾

Duplate Canada Limited and its associated companies, Smith and Stone Ltd. and Plax Canada Limited, indicated that they preferred no increase in rates on their moulding powder raw materials, but that if there were increases, they would require correspondingly appropriate increases in the tariff protection afforded to finished products.⁽³⁾

Many other submissions related only incidentally to heading 39.07, being primarily directed to other parts of Chapter 39, but because rate implications for heading 39.07 are involved, they are summarized in the following paragraphs.

The British Plastics Federation requested maintenance of existing margins of preference in so far as they exist in the plastics schedule. The Federation also specifically requested that there be no increase in the British preferential rate on manufactures of cellulose plastics under item 915(c) and registered an objection to the application of the proposed 25 p.c. rate under heading 39.07 to ABS and PVC pipe fittings which, it was claimed, were not at the time made in Canada.⁽⁴⁾ As indicated above, however, at least some of these are produced in Canada by Sceptre Manufacturing Company which subsequently objected to the proposed lower rates for these products.⁽⁵⁾

(1) Transcript, Vol. 157, p. 23328-31

(2) Same, Vol. 158, p. 23485

(3) Same, Vol. 159, p. 23700 and following

(4) Same, Vol. 123, p. 18477, 18480

(5) Same, Vol. 157, p. 23328

Union Carbide Canada Limited, in its brief on phenolic and epoxy resins under heading 39.01, referred to laminated products based on these resins that would now be classified under tariff item 916. While the forms sold by the company -- sheets, rods and tubes -- would probably be classified under heading 39.01, some laminated products might come under heading 39.07. The company's proposal for rates of 15 p.c., B.P. and 20 p.c., M.F.N. was in terms of heading 39.01.(1)

In conjunction with its submission on food casings which has been dealt with in the section of the report relating to heading 39.03, Union Carbide Canada Limited requested that rates of 15 p.c., B.P. and 20 p.c., M.F.N., also be applicable to any such casings that might be classified under heading 39.07.(2)

In discussion of its submission on expandable polystyrene beads used to make foamed polystyrene cups, Polychemical Industries Limited mentioned that these, if imported, would be dutiable at 15 p.c., B.P. and 20 p.c., M.F.N., and that the company sought no change in this arrangement.(3) There were said to be no imports as Canadian prices are below those in the U.S.A.; competition is provided by paper, injection moulded and vacuum moulded cups.

The Cryovac Division of W.R. Grace & Company of Canada Limited makes bags and pouches from polyethylene and polyvinylidene chloride resins, or combinations of these with polyethylene terephthalate film or regenerated cellulose film and uses purchased domestic or imported resins. The company also makes trays using imported oriented polystyrene sheet. It made no proposals for rates on finished products, but indicated that it considered that rates on film and sheet should equal those on resins. The company mentioned the possible classification of some printed products under tariff item 181, an item not referred to the Board. The spokesman for the company said: "our basic position is the same rate for everything, in whatever form. We are not greatly concerned...as long as it is not less than the resin or the film...we would not entertain or propose or support a higher duty."(4)

Canadian Buttons Limited made a general submission on raw materials used by the company, mentioning that its subsidiary Canadian Plastics Limited produces casein button blanks using Canadian rennet casein. This submission has largely been dealt with under heading 39.04, but it would appear that certain forms of the product would not be sufficiently advanced to be button blanks, other than in the rough, as provided for in tariff item 651, an item not in Reference 120. They might, however, be sufficiently processed to be excluded from heading 39.04 and thus fall under heading 39.07. The company wished to ensure that these, being made in Canada, be dutiable at 15 p.c., B.P. and 20 p.c., M.F.N. under the appropriate heading,(5) thus continuing the rates now provided under tariff item 920.

(1) Transcript, Vol. 125, p. 18723

(2) Same, Vol. 159, p. 23570, 23576

(3) Same, Vol. 135, p. 20125

(4) Same, Vol. 136, p. 20332

(5) Same, Vol. 161, p. 23974

A special problem was raised concerning products of vulcanized fibre, now dutiable at 17½ p.c., under both Tariffs, under item 509, which was not referred to the Board. As vulcanized fibre is a product of heading 39.03, manufactures thereof, in the B.T.N. system, could fall under heading 39.07. To the extent that these are of importance, and the Board has received no information on the subject, the Industry Committee⁽¹⁾ and Minnesota Mining and Manufacturing of Canada Limited⁽²⁾ suggested that the provision of item 509 be re-located at the existing rates under heading 39.03. Minnesota Mining and Manufacturing also made a proposal for adhesive coated pressure sensitive tape, now classified as a manufactured product under item 915(c). In the course of the hearing, however, it became clear that this is a product of heading 39.03.

In its submission on polymethyl methacrylate sheets, G.M. Plastics Corporation, Granby, Quebec, discussed its production of extruded sheets with prismatic designs for use as lighting fixtures, many of which are sold in profiles or shapes sufficiently processed to take them out of heading 39.02 and into heading 39.07. These are classified under tariff item 326f, Free, B.P., 15 p.c., M.F.N., when of a class or kind not made in Canada; when ruled made in Canada, they probably would be under tariff item 445, dutiable at rates of 20 p.c., B.P. and 22½ p.c., M.F.N. Item 445 was not included in Reference 120. This subject has been discussed in detail in the section of this report under heading 39.02 dealing with polyacrylic and polymethacrylic resins.

A submission was made by the Reinforced Division of the Society of the Plastic Industry of Canada Incorporated concerning the raw materials and products of the reinforced plastics industry. This submission incorporated a brief of two years previously to the Minister of Finance concerning glass-fibre reinforced polyester panels. It was indicated that 20 to 30 of the 150 companies in the reinforced plastics field produced some 80 per cent of the volume of products and that 26 of these larger companies supported the brief. These companies obtain 90 per cent of their raw materials in Canada. Only one major producer had refused his support. This submission is dealt with in the following paragraphs.

With respect to translucent panels, specifically, it was suggested that about 10 firms were producing these in Canada. The Canadian market was estimated to require about 3.6 million square feet annually,⁽³⁾ about 40 per cent going to industrial buildings and defence projects, about 40 per cent to consumer and residential uses and about 20 per cent to commercial applications such as signs and store fronts. About 40 per cent of the cost of materials consisted of polyester resins, 40 per cent fibreglass and 20 per cent release films (regenerated cellulose), pigments and catalysts. The U.S. market was said to exceed the Canadian market by 30 to 1 and the ten largest companies were said to be supplying 85 per cent of that market and enjoying economies of scale which could justify low prices on sales to Canada. Many of these U.S. producers were said to be vertically

(1) Transcript, Vol. 158, p. 23444

(2) Same, Vol. 162, p. 24089

(3) Same, Vol. 163, p. 24209-10

integrated, thereby achieving additional economies. Imports into Canada were estimated to hold about 50 per cent of the market, coming 80 per cent from the U.S.A. and the balance from Belgium and Japan. There were no exports of Canadian-made panels.

The firms in the reinforced plastics industry felt that, with equal access to raw materials and world markets, they would not need tariff protection against U.S. producers. However, the prices paid for raw materials tended to reflect the 27½ p.c. duty on glass fibre, the 5 p.c. duty on polyester resins and the 20 p.c. duty on regenerated cellulose film, and the companies are blocked from the U.S. market, for the panels, for example, by a duty of 21 cents per pound plus 17 p.c. ad valorem (said to be equivalent to about 34 to 38 p.c. ad valorem). They, therefore, considered that they required protection equal to that in the U.S.A., at least as a basis for negotiating reductions in the U.S. Tariff.

Many of the products of this industry are classified under items not within the terms of Reference 120: for example, fibreglass boats under tariff item 440a; heater and air system components under item 443; furniture under tariff item 519(2); buttons under item 651a and automotive components under item 438f. The panels, however, are dutiable at 15 p.c., B.P., 15 p.c., M.F.N. under tariff item 917(b), and manufactured products not more specifically provided for, at the same rates, under item 916.

To the extent that the products of the industry are within the terms of the Reference, the industry recommended rates of 25 p.c., B.P. and 30 p.c., M.F.N., as the protection it required.(1) The major concern appeared to be with the rate on goods from the United States. In the B.T.N., many of the products of this industry would be classified by heading 39.07; the translucent panels, however, if in the nature of reinforced plastic plates, surface-worked or not, merely cut into rectangles, would be under heading 39.01 as polyester plates. These products would only be in 39.07 if they had ground edges, or were drilled, milled, hemmed, framed or otherwise worked, or cut into other than rectangular shapes.

Plastic Bags

Canadian Industries Limited, Plastics Division, Mastex Films Unit, which makes polyethylene and regenerated cellulose plastic bags in plants at New Westminster, B.C., Winnipeg, Manitoba, Brampton, Ontario and Montreal, Quebec, made a submission concerning the appropriate rates of duty on all plastic bags.

In the company's submission, it was stated that about 50 companies produce bags in Canada, employing some 1,500 to 2,000 people, using specialized equipment for making plain, decorated, perforated and other forms of bags for packaging foods, textiles, housewares, chemicals, fertilizers and other products.

(1) Transcript, Vol. 163, p. 24188, 24197

In estimating the Canadian market for plastic bags, C.I.L. stated that it was using D.B.S. figures as adjusted by a trade publication, Canadian Packaging:

Factory Shipments of Plastic Bags, 1958-62

	<u>Value</u> <u>\$'000</u>
1958	18,539
1959	21,300
1960	23,000
1961	25,500
1962	28,000

Source: Transcript, Vol. 147, p. 21863, 21895

The company indicated that at the time of the hearing there were no significant imports of plastic bags, as there was little excess capacity abroad, but that price changes in the U.S.A. were making future imports more probable. While some exports had been achieved, Canadian costs were said to make unlikely the export of any significant part of Canadian production.

Plastic bags are dutiable at rates of 15 p.c., B.P., and 20 p.c., M.F.N., under tariff item 918(c), if made from regenerated cellulose film, and under item 908, if made from synthetic resin film. For specific end-uses, bags may be admitted free of duty under tariff items 663b and 791.

In conjunction with its proposal for polyethylene film, Union Carbide Canada Limited proposed that industrial bags of polyethylene be dutiable at the same rates as it proposed for the film, namely 15 p.c., B.P., 20 p.c., M.F.N., with a minimum rate of 8 cents per pound under both Tariffs.(1) The company's arguments were principally in terms of polyethylene film and, in particular, it advanced no reasons for applying the specific minimum to bags or for eliminating the present differentials in rates between films and bags.

When C.I.L. presented its submission, it modified its original proposal in order to exclude bags made from regenerated cellulose from the proposed M.F.N. rate of 30 p.c. for all industrial bags. It was stated that, as regenerated cellulose films and bags are at present dutiable at rates of 15 p.c., B.P., and 20 p.c., M.F.N., and as the producers of the film were proposing no changes in the rates on film, C.I.L. would recommend continuation of the existing rates on the bags.(2)

For all other bags the company proposed a rate of 30 p.c. under the M.F.N. Tariff, but did not recommend an appropriate rate under the B.P. Tariff or indicate a desirable margin of preference.

(1) Transcript, Vol. 139, p. 20717

(2) Same, Vol. 147, p. 21854

The 30 p.c. rate is 5 percentage points higher than the proposed rate for film and maintains the present differential between the rates on decorated polyethylene film and polyethylene bags. The company suggested that its proposal was consistent with those for resin and film and that the extra 5 percentage points would offset the minimum rate proposed for film. The higher rate would also offset higher unit "set-up" costs in Canada as compared with the U.S.A. and offset other cost disadvantages arising from the smaller size of the Canadian market.

C.I.L. specifically opposed the continued free entry of fertilizer bags under tariff item 663b and also free entry of bags under any other end-use provisions. It suggested that the elimination of these provisions would assist Canadian producers to reduce costs by obtaining the entire Canadian market. In a written submission, the Consolidated Mining and Smelting Company of Canada Limited indicated that it had no objection to the classification of plastic bags under heading 39.07 provided that the classification had no bearing on the present provision for bags for fertilizers, duty-free under tariff item 663b; this latter item was the subject of a submission by the company at the hearing on fertilizers.

At the hearing on fertilizers, the producers of polyethylene, C.I.L., Dow Chemical, Du Pont and Union Carbide registered their opposition to the free entry of polyethylene bags for use in packaging fertilizers. The Canadian Fertilizer Association and the Canadian Federation of Agriculture indicated that the present duty-free provisions of tariff item 663b continue to apply.⁽¹⁾

Other Products of Heading 39.07

In letters to the Board, entered in the official report, Beauty Industries Limited, Hamilton, Ontario, asked for increased rates on vinyl clothing such as waterproof babies' panties and similar products made from light gauge vinyl plastics. The company pointed out that its products, under tariff item 908, had protection of 15 p.c., B.P. and 20 p.c., M.F.N., the same rates as are applicable to the major raw material, embossed and decorated vinyl sheeting, under item 905(d)2. It was claimed that material costs are 20 per cent higher than in the U.S.A., but prices of the finished products are the same as or lower than, in that country despite lower production. More than 50 per cent of the cost of production was said to be attributable to the materials used for binding, such as elastic, rayon, braid and thread, and to labour and packaging. The company stated that the five or six major, and about six smaller, manufacturers of these products in Canada were suffering from increasing competition from imports which had forced a decline in prices of 10 to 20 per cent between 1959 and 1963, partly offset by reduction in quality. To meet competition from low wage countries and to offset the higher impact of sales tax which, for domestically produced goods, is levied on the wholesale selling price but which, for imported goods, is levied on the duty-paid value, Beauty Industries Limited suggested the establishment of a separate

(1) Transcript, Vol. 84, p. 12906

item for vinyl clothing with rates of $27\frac{1}{2}$ p.c. or 30 p.c.⁽¹⁾ The company did not propose rates specifically for the B.P. or M.F.N. Tariffs, nor did it appear to take into account any proposed increase in rates on the vinyl sheeting used in its manufacturing operations.

Triad Creations Limited, Drummondville, Quebec, which imports styrene beads to be processed into imitation pearls for costume jewellery, stated that the beads are not made in Canada and that it imports a considerable quantity. At present, these goods are imported free of duty under both the B.P. and M.F.N. Tariffs under temporary item 326q. The company proposed that the tariff provision be made permanent, possibly by combining it with that of tariff item 326d.⁽²⁾ In commenting on this proposal, Dow Chemical said that its primary interest would be in supplying the polystyrene resin and that the introduction of permanent free entry might inhibit the production of the beads by a Canadian moulder. The company estimated the market at several thousands of dollars annually. In the absence of a precise description, it is not entirely clear whether the beads are sufficiently processed to be classified as articles under 39.07 or to remain under heading 39.02.

A number of representations related to products now included in the plastics Tariff Schedule but not covered, in the context of the complete B.T.N., by heading 39.07.

The American Optical Company of Canada Limited, which produces in Canada sun-glasses with imported lenses made from polarizing plastic sheet, made representations concerning a possible extension of the company's manufacturing operations in Canada. At present the company imports finished lenses from the United States with the payment of duty at 20 p.c. under tariff item 327. Such lenses are made from a sheet produced by bonding a film of polyvinyl alcohol that has been oriented by stretching and has been stained with a dichroic dye between two flat sheets of cellulose acetate butyrate (one of which may be coloured). The latter sheets are sub-coated to promote adhesion to the film. This sandwich material may be coated with other resinous materials to promote abrasion resistance; it is then stamped, bent or heat-formed to fit a particular frame or holder. The product is imported in sheets less than 6 inches in width, too far processed to enter under tariff item 913(b) at 15 p.c., M.F.N. It would be dutiable at 20 p.c., M.F.N., under item 915(c).

The company proposed free entry, under the M.F.N. Tariff, for polarizing plastic sheets or plates requiring further manufacture. Although not incorporated in the proposal, it was indicated that the interest of the company was limited to sheets or plates less than 6 inches in width.⁽³⁾ It was claimed that this material is not made in Canada and not likely to be produced here in the foreseeable future. The foreign content is now 35 to 50 per cent of the total cost, depending on the style. Lower costs would enhance the competitive position with respect to imports of finished goods. It was also pointed

(1) Transcript, Vol. 163, p. 24215

(2) Same, Vol. 99, p. 15069

(3) Same, Vol. 160, p. 23721

out that other components of finished spectacles had lower rates of duty; for example, cellulose plastic plates and sheets for the manufacture of frames are free of duty under both the B.P. and M.F.N. Tariffs under tariff item 924c.

In commenting on this proposal, a spokesman for the Industry Committee pointed out that in the Brussels Tariff Nomenclature, polarizing material in sheets or plates is covered by heading 90.01. He therefore suggested that if the Board wanted to recommend the item proposed by American Optical, it do so outside the framework proposed by the Committee for the chemicals and plastics schedule.⁽¹⁾

W.G. McKinnon and Associates presented a brief on plastic pump-type dispensers on behalf of the manufacturer, Calmar Corporation, Cincinnati, Ohio, and the following interested parties:

Four manufacturers of containers used with these dispensers:

Imco Containers (Canada) Limited, Cooksville, Ont.
 Dominion Glass Company Limited, Montreal, Que.
 Consumers Glass Company Limited, Toronto, Ont., and
 Polybottle (1960) Limited, Weston, Ont.

Nine companies selling packaged products with the dispensers:

G.H. Wood and Company Limited, Toronto, Ont.
 The Drackett Company of Canada Limited, Stratford, Ont.
 Alberto-Culver of Canada Limited, Oshawa, Ont.
 Warner-Lambert of Canada Limited, Toronto, Ont.
 Thomas Supply and Equipment Limited, Ottawa, Ont.
 Kert Manufacturing Company Limited, Toronto, Ont.
 Austin Laboratories Limited, Paris, Ont.
 Beauty Counselors of Canada, Windsor, Ont. and
 The Andrew Jergens Company Limited, Perth, Ont.

Pump-type dispensers are used in competition with aerosol spray dispensers, although they are not completely interchangeable. Neither product is produced in Canada, but aerosol valve assemblies and parts thereof are free of duty under both the B.P. and M.F.N. Tariffs under tariff item 924 (an item not in Reference 120), while the pump-type or mechanical dispensers are dutiable at 15 p.c., B.P. and 20 p.c., M.F.N., under tariff item 908.

The Board was advised that Calmar Corporation supplies about 90 per cent of the Canadian market for these dispensers, which are being used increasingly in Canada, although at the time of the hearing the market was said to be only 3 per cent of the size of the aerosol market. Originally these dispensers were supplied attached to, but separate from, the container and they could be re-used; this practice was being replaced by dispensers fitted to the container and discarded when the container is empty. Calmar Corporation is interested in manufacturing in Canada, but considered that an annual demand in Canada of \$250,000 was necessary before Canadian manufacture would be practical. This is about three times the estimated size of the market at the time of the hearing.⁽²⁾

(1) Transcript, Vol. 160, p. 23714

(2) Same, Vol. 163, p. 24247

It was proposed that free entry for three years should be granted to enable the development of the market to the point where Canadian manufacture would be feasible. It was also suggested that encouragement of the use of the dispensers would increase consumption of Canadian-made glass or plastic containers.

Under the B.T.N., these dispensers would be classified as "mechanical appliances (whether or not hand operated) for projecting, dispersing or spraying liquids or powders" under heading 84.21.

In a submission requesting that closures be excluded from tariff item 791, Anchor Cap and Closure Corporation of Canada Limited indicated that, except where such products are admissible under end-use items, they are dutiable at rates of 15 p.c., B.P., 20 p.c., M.F.N. under either item 432d or 908, depending upon the material from which they are manufactured. The company requested continuation of these rates and the discontinuance of free entry under item 791 to enable them to compete with imported closures for insecticides and pesticides, thus increasing its share of the market. Item 432d is not part of Reference 120.⁽¹⁾ Except to the extent that they would be classified under heading 84.21, such closures, if made of plastic, would fall under heading 39.07 of the B.T.N.

Representations were received by the Board concerning plastic films coated with iron oxide used for recording electrical impulses, for use as videotape and instrumentation tape. The films were said to include polyester, cellulose acetate and polyvinyl chloride. Minnesota Mining and Manufacturing of Canada Limited proposed an exception to the proposed heading rates for products described as above, the rates to be 5 p.c., B.P., 10 p.c., M.F.N., and 30 p.c., General, until such products are made in Canada. If videotape or instrumentation tape becomes made in Canada, the company suggested that its proposed heading rates of 15 p.c., B.P. and 20 p.c., M.F.N. apply.⁽²⁾ The company stated that it would prefer free entry for such tapes, but pointed out that it is difficult to distinguish them visually from sound recording tapes now dutiable at the above rates under item 595(2); it was suggested that present differences in width might not continue to prevail. Item 595(2) is not in Reference 120, but item 658b, applicable to video tape, n.o.p., with rates of 15 p.c., B.P. and 20 p.c., M.F.N., is included, and instrumentation tapes are also in the Reference, under items 908 and 915(c) at rates of 15 p.c., B.P., 20 p.c., M.F.N. The effect of the company's proposal, therefore, would be to make all these forms of tape dutiable at 5 p.c., B.P., 10 p.c., M.F.N. In the B.T.N., these tapes are classified by heading 92.12, the adoption of which was not proposed to the Board.

The Canadian Association of Broadcasters made representations concerning video tape, n.o.p., as now classified under tariff item 658b, at rates of 15 p.c., B.P., 20 p.c., M.F.N. The Association noted the relevance also of items 658 and 658a which provide for certain video tapes containing programmes; these two items are not part of the Reference and the Association desired no change in either of them. Item 658b provides for any other form of programmed video tape and also

⁽¹⁾ Transcript, Vol. 109, p. 16572; Vol. 165, p. 24489

⁽²⁾ Same, Vol. 162, p. 24088

for blank tape. The Association did not want any change in the rates on programmed tape. Unprogrammed video tape was said to be an expensive, high quality product, the manufacture of which requires costly machinery; it is not made in Canada. The Association therefore requested free entry under both Tariffs, at least until it is made in Canada, for "video tape without programme material recorded thereon."⁽¹⁾ The Association considered that neither the polyester resin tape nor the iron oxide coating was available in Canada in the required quality. In 1962, about 95 per cent of the market of about \$600,000 was supplied from the United States and the remainder from Britain. The existing margin of preference had not, therefore, resulted in significant importation from Britain.

The Association of Motion Picture Producers and Laboratories of Canada drew attention to what was described as an archaic provision in tariff item 915(b) for "cellulose nitrate cinematograph and moving picture films, negatives, n.o.p." Nitrate base stock has been entirely replaced by acetate and the latter is usually classified under tariff items 187b and 187e, neither of which is in Reference 120. In the B.T.N., both cellulose nitrate and cellulose acetate motion picture films would be classified under headings in Chapter 37, not considered by the Board. While the Association did not consider this to be a matter of great concern, it suggested that the Customs Tariff be tidied up by adding cellulose acetate to item 915(b) or replacing the word nitrate with the word acetate.⁽²⁾ The effect of such a proposal on items 187b and 187e is not clear, but it would remove any cellulose acetate film now classified under tariff item 915(c) at rates of 15 p.c., B.P., 20 p.c., M.F.N. to 915(b) at rates of 10 p.c., B.P., 10 p.c., M.F.N.

Two submissions received by the Board at the hearing on resins and plastics had reference to manufactured products that are apparently outside the Board's terms of reference. Armet Industries Limited, in its brief on silicones, requested rates of 15 p.c., B.P. and 20 p.c., M.F.N. on "further manufactured and/or fabricated parts" made from imported materials or from silicone compounds produced in Canada from imported resins.⁽³⁾ Two companies in Canada were said to be active in this field; imports hold 10 to 15 per cent of the market. The Canadian producers, using raw materials now free of duty or dutiable at 5 p.c., were said to suffer from disabilities of scale. Their products, which would probably be under B.T.N. heading 39.07, are at present classified as manufactures of rubber under tariff item 618 at the rates proposed by Armet. This item was not referred to the Board and, as at present administered, would likely continue to apply to these goods.

AnSCO Canada Limited requested free entry for sensitized photographic film and paper in master rolls to be converted into commercial sizes and packaged in Canada. Since the hearing, temporary tariff item 187g has come into existence to cover these products, which do not appear to have previously been dutiable under items included in the Reference. Under the B.T.N., they would be classified by headings 37.02, 37.03 and 48.07, none of which has been proposed for adoption into the Canadian Tariff.

(1) Transcript, Vol. 163, p. 24256

(2) Same, Vol. 160, p. 23808

(3) Same, Vol. 133, p. 19864

Other Tariff Considerations

The foregoing paragraphs illustrate some of the problems in relating a residual Brussels heading, such as 39.07, to the existing Canadian Customs Tariff. Among the products of this heading which are now classified under items not within the Board's terms of Reference, there have been mentioned lighting fixtures of polymethyl methacrylate sheet which, when of a class or kind made in Canada, would probably be under tariff item 445; manufactured silicone products now considered to be manufactures of rubber under tariff item 618 and manufactured products of vulcanized fibre, now under tariff item 509. In addition, the Industry Committee in its statement on the heading drew attention to the following products of 39.07 which may be classified under the items indicated:⁽¹⁾

	<u>Tariff Item</u>	<u>Rates of Duty</u>	
		<u>B.P.</u>	<u>M.F.N.</u>
Certain sanitary ware	289	12 $\frac{1}{2}$ p.c.	22 $\frac{1}{2}$ p.c.
Fancy goods, statuettes, etc.	624	17 $\frac{1}{2}$ p.c.	17 $\frac{1}{2}$ p.c.
Parts of cases, etc.	623	12 $\frac{1}{2}$ p.c.	22 $\frac{1}{2}$ p.c.

This list is not exhaustive and does not take into account various tariff provisions for parts or general end-use items.

There are also products considered to be manufactured plastics products in the present Tariff which, in the B.T.N., are provided for outside of Chapter 39. Those mentioned above include:

	<u>Tariff Item</u>	<u>B.T.N. Heading</u>
Polarizing plastic sheet	915(c)	90.01
Videotape	658b	92.12
Instrumentation tape	908, 915(c)	92.12
Certain photographic films	915(b) and (c)	Chapter 37
Plastic pump-type dispensers	908	84.21

The dividing lines between semi-finished and finished goods are not necessarily the same in the B.T.N. as they are in the existing Tariff. Synthetic resin floor tiles, specifically mentioned in tariff item 908, remain in the earlier headings of Chapter 39 if they are merely plastic sheets or plates cut into rectangles. There are similar, although less specific, difficulties with respect to food casings, protein plastic shapes used for making button blanks and beads, drops and shapes used in the manufacture of imitation pearls.

Of the tariff items listed earlier in this section of the report, it will be noted that the plastics products of tariff items 326d, 326f and 326q are within Chapter 39, although not necessarily in 39.07, but the Board received no representations concerning item 326d

⁽¹⁾ Transcript, Vol. 162, p. 24069-70

other than the proposal that 326q be incorporated with it. No representations were received concerning items 577 and 654a, nor was the classification in the B.T.N. of the goods covered by these items discussed before the Board. Item 658b was the subject of proposals to the Board. Consideration of items 660a and 660b was deferred to Reference 133, Machinery and Apparatus Used by the Printing Industry. Plastic bags for the end uses mentioned in items 663b and 791 are, in the B.T.N., covered by heading 39.07. Tariff item 711 is of a very general nature and could provide for a wide range of plastic products. Specific products under the manufactured plastics items listed, except for items 915(a) and 924b, have been discussed but no representations were received specifically relating to these two items. As has been pointed out, not all the products of 908, 915(b), 915(c), 916, 918(c) and 920 would be classified by Chapter 39 of the B.T.N., and not all those which would be in Chapter 39 would come under heading 39.07.

OTHER PORTIONS OF REFERENCE 120

In addition to the submissions discussed in the various product reports based on the headings of the Brussels Tariff Nomenclature, the Board received a number of representations which could not conveniently or completely be considered on such a basis. These proposals related to products not classified under nor related to any of the headings of the Nomenclature, to existing general or end use items in the Customs Tariff, to proposed new end use items or to the general interest of companies or associations. While a number of these submissions have been mentioned in relation to certain specific goods, some additional discussion is necessary to ensure more complete coverage of the representations made to the Board during the course of the public hearings.

Elemental Metals

The elemental forms of a number of metals are at present classified under items included in Reference 120, but not under headings of the Brussels Tariff Nomenclature proposed for adoption by the Board. Relevant tariff items, referred to the Board in so far as they relate to chemicals, are 208t and 711; tariff item 316b was referred in so far as it relates to chemicals or plastics and item 347e was added by the Board on the grounds that it covered a product classified under item 208t at the time it was referred.

The pertinent portions of the four items, with extracts and rates of duty, are as follows:

	<u>British Prefer- ential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
208t All chemicals and drugs, n.o.p., of a kind not produced in Canada Ex. Cobalt metal, in lumps, powder, ingots, blocks or bars	Free	15 p.c. 10 p.c.
316b Metallic elements and tungstic acid when imported by manufacturers for use only in their own factories in the manufacture of metal filaments for electric lamps	Free	Free
347e Electrolytic manganese metal for alloying purposes	Free	5 p.c.
711 All goods not enumerated in this schedule as subject to any other rate of duty, and not otherwise declared free of duty, and not being goods the importation whereof is by law prohibited Ex. Cobalt metal, in lumps, powder, ingots, blocks or bars	15 p.c.	20 p.c. 10 p.c.

End use item 316b would apply to any metals imported for the purpose stated. The other items would cover, in so far as the Board has been able to determine, elemental forms of beryllium, cadmium, cobalt, germanium, hafnium, indium, magnesium, manganese, molybdenum, niobium (columbium), rhenium, tantalum, thorium and vanadium, and forms, if any, of antimony not admissable under item *330, of titanium not admissable under item *347c and of zirconium not under item *347d. In the Brussels Nomenclature, tungsten, which is understood to be imported under item 316b, would fall under heading 81.01; other relevant headings are 77.01 (magnesium), 77.04 (beryllium), 81.02 (molybdenum), 81.03 (tantalum) and 81.04 (all others listed).

The administrative classification of these materials as chemicals is borne out, as indicated above, by the previous classification of manganese under item 208t and the provision for cobalt under an extract of 208t. It should be noted that this provision is also extracted from tariff item 711; it is understood that cobalt and other metallic elements are only considered to be chemicals which might qualify for entry under item 208t when in the forms of lumps, powders, ingots or blocks. Bars are held to be a further manufactured form, and, where no other tariff provision exists, are unenumerated articles of tariff item 711. Cadmium, being included in the list, published by the Department of National Revenue, of chemicals ruled to be of a kind made in Canada, is dutiable under tariff item 711.

Only four firms made representations relating to the products or items under discussion. Tungstic acid, mentioned in item 316b, is a product of B.T.N. heading 28.28 but was not discussed at the hearing on that heading nor mentioned by any company. At the hearing on item 316b, the Industry Committee suggested that, if tungstic acid should be sufficiently important to have separate treatment, it should be provided for as an extract from heading 28.28 until such time as it should be made in Canada.⁽¹⁾ In a letter to the Board, relating to item 316b, Tung-Sol of Canada Ltd., Bramalea, Ont., indicated its interest in the item in so far as it related to tungsten filaments for electric lamps. The company suggested that, as tungsten is a metal rather than a chemical, item 316b should not be further considered by the Board.⁽²⁾

Dominion Magnesium Limited, in a letter to the Board, speaking as a producer, recommended that there be no increase in duties on magnesium and thorium metals. Because most of its output is exported to the U.S.A., the company recommended that reductions in duty be offered contingent on reduction of U.S. duties on imports of these products.⁽³⁾ The company's representation, which related also to certain alkaline-earth metals, is dealt with in the section of the report on B.T.N. heading 28.05, which provides for "Alkali, alkaline-earth and rare earth metals; yttrium and scandium; mercury."

Cobalt Refinery Limited, Cobalt, Ontario indicated that it is a potential producer of cobalt metal, although, at the time, all its cobalt was sold as cobalt oxide, a product discussed in the section

(1) Transcript, Vol. 90, p. 13667

(2) Same, Vol. 90, p. 13666

(3) Same, Vol. 7, p. 1126-7

of the report dealing with heading 28.24. In the company's opinion, duties of 15 p.c., B.P. and 25 p.c., M.F.N., would make it economic for it to go into the production of cobalt metal for sale in Canada and the U.S.A.⁽¹⁾

Union Carbide Canada Limited, as a user of cobalt and manganese metals, requested free entry for these materials until such time as they are made in Canada, at which time the company would not object to appropriate rates of duty. In the case of manganese, as a potential producer, the company would "expect to be able to ask the proper agency of government for some suitable protection",⁽²⁾ after production should commence in Canada.

Synthetic Waxes

During the course of the public hearings, it became apparent that certain goods classified in items included in Reference 120, such as 208t, 220a(i), 711, Ex. 711 - synthetic wax, and 901(a)8, fall, in the B.T.N., under heading 34.04:

"Artificial waxes (including water-soluble waxes); prepared waxes, not emulsified or containing solvents."

Heading 34.04, however, goes beyond the scope of Reference 120 and it was not proposed for adoption by the Board.

In addition to the representations concerning polyethylene wax discussed in the section of the Report on heading 39.02, the Board received a proposal from the Canadian Manufacturers of Chemical Specialties Association concerning a number of waxes of heading 34.04, being either chemically modified mineral waxes or synthetic resin waxes.⁽³⁾ On the grounds that none of these are produced in Canada, free entry under the B.P. and M.F.N. tariffs was proposed for montanic acid ester waxes, oxidized microcrystalline waxes and Fischer-Tropsch waxes, all of which are now dutiable at 15 p.c., B.P., 15 p.c., M.F.N., under tariff item 711 and an extract thereof, and for oxidized and unoxidized polyethylene waxes of a molecular weight of 5,000 or less, which were said to be dutiable at the same rates as the other waxes, but which are actually classified under tariff item 901(a)8 at 7½ p.c., B.P., and 7½ p.c., M.F.N.

In connection with a proposal for the retention of tariff item 921 or a similar item, Harrisons & Crosfield (Canada) Limited mentioned chlorinated paraffin, a product of heading 34.04, as one of those imported free of duty, under both the B.P. and M.F.N. tariffs, under 921 when for the uses mentioned in that item, and otherwise under tariff item 208t, Free, B.P., 15 p.c., M.F.N.⁽⁴⁾

(1) Transcript, Vol. 165, p. 24496-7

(2) Same, Vol. 165, p. 24493

(3) Same, Vol. 165, p. 24474

(4) Same, Vol. 174, p. 28508, 28514

Tariff Items 208e, 208u and 270

	<u>British Prefer- ential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
208e Cresylic acid and compounds of cresylic acid, used in the process of concentrating ores, metals or minerals, n.o.p.	Free	15 p.c.
208u Xanthates and sulpho-thio-phosphoric (dithio-phosphoric) compounds, for use in the process of concentrating ores, metals or minerals	Free	Free
270 Oil for use in the concentration of ores	Free	Free

These three end-use items were the subject of representations by the mining industry and by chemical manufacturers producing goods imported under the items or goods competitive with such imports. While these views have been discussed in relation to certain specific products in the appropriate sections of the report, some summary of the points raised at the time the items were called for public hearing seems advisable.

The Canadian Metal Mining Association, speaking on behalf of the metal mines of Canada, urged the retention of these items⁽¹⁾ covering the key chemicals used in the recovery of certain minerals from ores by the flotation method. It indicated that imports in 1961 under the three items amounted to more than \$2 million, which was about one-half the total consumption of such goods. It suggested that imports were primarily of materials not available in Canada.

The Consolidated Mining and Smelting Company of Canada also urged the retention of these items.⁽²⁾ It stated that the materials it required were not produced in Canada, with the exception of the xanthates of tariff item 208u which Cominco obtained mostly from the Canadian producer. The company opposed any modification of the items that would either increase its operating costs or otherwise affect its large export markets through reciprocal increases in duties by other countries.

Dominion Tar and Chemical Company Limited, Toronto, Ontario, which produces cresylic acid in Canada, stated that it would not be interested in selling to Western Canada the small amounts required for this purpose and that if the Board should see fit to make special provision for this use, it would not object.⁽³⁾

(1) Transcript, Vol. 88, p. 13401

(2) Same, Vol. 88, p. 13413

(3) Same, Vol. 88, p. 13446

The Canadian Chemical Company Limited proposed the elimination of tariff item 208u, primarily because of its concern with the xanthates, which it produces at Edmonton and which, in Canada, are used solely for concentrating ores, metals or minerals.⁽¹⁾ It stated that all the major xanthates are made in Canada, and urged that any others could specifically be given free entry until such time as they are produced here. The company's spokesman expressed the view that the mining companies would be protected against increases in duties by the export drawback provisions.

As a manufacturer of xanthates, Cyanamid of Canada Limited supported the position of the Canadian Chemical Company Limited, pointing out that xanthates imported into the U.S.A. were subject to a duty of $10\frac{1}{2}$ per cent, which excluded Canadian materials although that country was the principal source of Canadian imports.⁽²⁾

On tariff item 270, the Canadian Chemical Company Limited suggested that this item covered materials produced by the company or competitive with such materials. It recommended either that the "not-made" materials under the item should be specifically named in the Tariff or that the item be reworded to exclude products made in Canada.⁽³⁾ The company's concern arose out of competition between the frothing agents it produces and those imported under this item, although the area and extent of competition was not clearly established.

As part of a joint general submission on a number of end-use items, Canada Packers Limited, Emery Industries (Canada) Limited and Harchem Limited also suggested limiting item 270 to products of a class or kind not made in Canada.⁽⁴⁾

Tariff Items 585b and 590

Two temporary items referred to the Board in the Minister's original letter of reference appear to relate to products classified in Chapter 27 of the B.T.N., which was not proposed for adoption by the Board. These were items 585b, which expired on January 1, 1959 and item 590 which has been renewed from time to time. These items are:

		<u>British Prefer- ential Tariff</u>	<u>Most- Favoured- Nation Tariff</u>
585b	Coke oven light oils for use in the manufacture of benzene and other related aromatic hydrocarbons per gallon	1/3 ct.	1/3 ct.
590	Naphtha, high flash, for use in Canadian manufactures per gallon	1/3 ct.	1/3 ct.

⁽¹⁾ Transcript, Vol. 88, p. 13463

⁽²⁾ Same, Vol. 88, p. 13473

⁽³⁾ Same, Vol. 89, p. 13611

⁽⁴⁾ Same, Vol. 90, p. 13623

In the absence of these items, coke oven light oils and naphtha derived from coal-tar or coke ovens would be dutiable at 15 p.c., B.P. and 20 p.c., M.F.N. under tariff item 711. These items provide the same rates of duties as would be applicable to petroleum feedstocks for the manufacture of benzene and other related aromatic hydrocarbons and to naphtha derived from petroleum under tariff item 269(ii).

Representations relating to both these items were received from the Steel Company of Canada Limited. The company urged that item 585b be not reinstated⁽¹⁾ in any form that would provide for these materials, when containing over 50 per cent of aromatic hydrocarbons, and that such materials be dutiable at the rates proposed by the company for benzene, toluene and xylene, i.e. $7\frac{1}{2}$ p.c., B.P. and 10 p.c., M.F.N.; these products are discussed in the section of the report on B.T.N. heading 29.01. The company's proposal would also apply to petroleum feedstocks which, however, appear to be outside the scope of Reference 120.

With respect to item 590, the Steel Company proposed that it be retained, but that the wording be changed to "Naphtha, high flash" and that it be made duty-free under all tariffs.⁽²⁾ This item would apply to naphtha whether of coal-tar or petroleum origin.

Coke Oven Light Oil

The coke oven light oil of tariff item 585b is a crude by-product of the steel industry. A good quality oil was said to contain 60 to 70 per cent benzene, 10 per cent to 15 per cent toluene and about 3 per cent xylene. In the refining process there are removed some 10 to 15 per cent of impurities such as natural gums and naphthalene, while about one per cent of mixed higher-boiling aromatics is recovered as high-flash solvent naphtha. The presence of the impurities make it unsuitable for catalytic fractionation to recover benzene, toluene and xylene without prior partial distillation.

It is understood that item 585b was introduced, at a time when there was a shortage of benzene in Canada, to enable a small independent refiner, who is no longer in the business, to import coke oven light oils to supplement supplies available in Canada. When the situation altered, through increased capacity at the Steel Company to refine light oils, the item was allowed to lapse.

It is understood that Stelco uses its refining capacity to process purchased light oils, which are not available in large quantity, and petroleum feedstocks. Since the independent refiner ceased operations, it is understood that Stelco is the only company with capacity to process purchased coke oven light oil. Coke oven light oils are also produced by the other Canadian steel producers and by the Quebec Natural Gas Company. With the exception of Dominion Foundries and Steel Limited, these firms were said to produce benzene, toluene and xylene from the coke oven light oils generated by their operations.

⁽¹⁾ Transcript, Vol. 90, p. 13669

⁽²⁾ Same, Vol. 116, p. 17421

The ad valorem equivalent of the rates of duty under former item 585b was said to be about 3 or 4 per cent. In the absence of any specific provision, these products would be dutiable under tariff item 711, unless held to be more specifically described by heading 38.19 of the B.T.N.

High-Flash Naphtha

This product is used in certain special paints or finishes and for some other purposes. The Stelco product was said to be limited to a single grade that did not meet the technical requirements of all Canadian users; there were, therefore, imports of the other grades. The ad valorem equivalent of the rates applicable to imports under tariff item 590 was said to be about 1 p.c.; in the absence of this item the same rates would be applicable to petroleum-derived naphtha under 269(ii) but the coal-tar product would be dutiable under tariff item 711.

While there were said to be other Canadian producers of high-flash naphtha, they made no representations to the Board. The spokesman for Stelco, however, suggested that Canadian production could not supply the entire market.

At the public hearing, it was suggested that the wording "for use in Canadian manufacture" was used in item 590 to enable it to be inserted in the Tariff by Order-in-Council, as all the product would be so used. In a permanent item, this phrase would not be required. The spokesman for Stelco also suggested that the existing rate of duty was so insignificant that it might well be removed.

Tariff Items 208x and 209f

Tariff item 208x, at the time the hearings commenced, provided free entry under all Tariffs for:

"Materials and parts, entering into the cost of cyanide of calcium, cyanide of potassium and cyanide of sodium, when imported by manufacturers of cyanide of calcium, cyanide of potassium and cyanide of sodium for use in their own factories."

In 1962, an Order-in-Council item was introduced, under the number 209f, simplifying the provision to

"Materials and parts, entering into the cost of cyanide of calcium, cyanide of potassium and cyanide of sodium, for use in the manufacture of cyanide of calcium, cyanide of potassium and cyanide of sodium."

Subsequently, item 209f was allowed to expire and its wording replaced the older wording in an amended statutory item 208x. The free entry provision of these items appears to be related to the free entry granted under tariff item 208 to cyanide of calcium, cyanide of potassium and cyanide of sodium. These chemicals are discussed in the section of the Report dealing with B.T.N. heading 28.43.

The only submission relating to items 208x or 209f came from Shawinigan Chemicals Limited, a producer of sodium cyanide. The company stated that:

"In so far as the chemical raw materials for sodium cyanide ... are concerned, we have no objection to having them deleted from 208x and accorded the rates proposed by their manufacturers, provided similar treatment is accorded the raw materials for the other cyanides mentioned therein." (1)

With respect to what were described as the "non-chemical" provisions of tariff item 208x, Shawinigan Chemicals drew an analogy between the position of producers of cyanides and those of fertilizers and synthetic rubber. In these cases, all types of materials could be imported duty-free under items 208x, 663b or 851, while the end products compete with materials that are either duty-free or subject to a duty of 5 per cent under the M.F.N. Tariff. The company suggested that the same provision be made for the non-chemical parts of item 208x as would be made for the non-chemical portions of items 663b and 851. (2)

Tariff Item 208w2

This item provides free entry under all tariffs for "crude bromides for the production of bromine." A statement on behalf of Dow Chemical of Canada Limited indicated that bromine is produced by the company's parent firm in the U.S.A., but is not made in Canada. The company suggested that the item could be dropped as being of no importance, but that if any other interested party had a use for the item, the products concerned could be specifically named and given specific treatment until such time as they might be produced in Canada. (3) No other party indicated any interest in the item.

Tariff Item 851

The present wording of this Order-in-Council item, which provides duty-free entry under all Tariffs, is: "Materials for use in the manufacture of synthetic rubber." Polymer Corporation Limited, Sarnia, Ontario, is virtually the sole producer of synthetic rubber in Canada, but item 851 is also available to firms importing materials to make products supplied to Polymer for the end-use specified in the item.

At the time item 851 was referred to the Board, it was worded "Materials for use exclusively in the manufacture of synthetic rubber." It was reported to the Board that the word "exclusively" was removed from the item to relieve the difficulties of a firm supplying Polymer which had an inevitable by-product in the process of manufacturing the material sold for use in the manufacture of synthetic rubber. (4)

(1) Transcript, Vol. 30, p. 4510

(2) Same, Vol. 30, p. 4511; Vol. 80, p. 12191

(3) Same, Vol. 80, p. 12190

(4) Same, Vol. 89, p. 13527

In urging the continuation of the provisions of item 851, Polymer Corporation drew attention to its unusual history and circumstances. The company was established during the Second World War to provide synthetic rubber to replace the natural rubber previously imported from Japanese-occupied areas in the Far East. A number of similar plants were established in the United States. In the post-war period, the company undertook the transition to peace-time circumstances by carrying out policies of maximizing and diversifying production so as to produce the widest possible range of synthetic rubber at the lowest possible cost, of establishing world wide export markets based on quality products, competitive prices, continuity of supply and top-flight technical service, and of establishing a comprehensive research and development effort.⁽¹⁾

Polymer Corporation has become a highly integrated producer of a wide variety of synthetic rubbers with subsidiary plants in other countries. From its original designed capacity of 41,000 tons, limited to two families of rubber, the company has expanded to the point where it produces 42 different varieties or types belonging to six different families. In 1961, production amounted to 161,000 long tons, of which approximately 70 per cent was exported.⁽²⁾ The company has also established subsidiaries in other countries.

During the period of Polymer's expansion, the company had access to its raw materials free of duty, faced competition from products imported either free of duty, or in the case of crude synthetic or natural rubber from M.F.N. countries dutiable at a rate of 5 p.c., and had access to export markets where there was either no duty or a very low rate. The company favoured the continuation of these circumstances and pointed out that, in any case, the items relating to its products were not part of Reference 120.

In rebuttal of possible arguments that drawback of duty on imported materials used for exports would mean no change in the company's position should item 851 be revoked, the spokesman for Polymer stated that item 851 was also essential if the company were to maintain its position in the domestic market and that this market was necessary to keep costs at a level enabling it to compete in the export market.

Polymer also opposed the restriction of item 851 to materials of a kind not made in Canada. The company claimed that it purchased as much as possible of its requirements in Canada, but that the duty-free provisions of item 851 ensure that Canadian materials are available at world prices; it also sought to maintain alternative sources of supply of its materials. The company does import a substantial amount; at the hearing its spokesman said:

"In 1961 the cost of materials imported by Polymer under Tariff Item 851 amounted to approximately \$10 million, or one third of the cost of materials used in the manufacture of synthetic rubber. The majority of materials which are imported are not produced in Canada or are not available

(1) Transcript, Vol. 89, p. 13490-1

(2) Same, Vol. 89, p. 13494, 13542

in sufficient quantities to support our full operations. The cost level of these materials is directly affected by Tariff Item 851. Had provision been made solely for these materials on a "not made in Canada basis" this would not have met the overall situation.

"It should be noted that materials are also imported under Tariff Item 851 by our Canadian suppliers. Detailed figures are not available to Polymer, but their volume of imports would be in addition to direct imports made by us ..."(1)

Information available to the Board suggests that, in recent years, imports under Tariff Item 851 have been between \$9 and \$12 million.

As a supplier of di-isopropylbenzene hydroperoxide, Harrisons & Crosfield (Canada) Ltd., requested continuation of the free entry for materials for use in the manufacture of synthetic rubber(2) now provided in tariff item 851. The material in question, which is not made in Canada, is supplied to the Polymer Corporation for use as a polymerization initiator or catalyst. The Industry Committee recommended, as an alternative, that free entry be provided specifically for this chemical, for any use, until such time as it is made in Canada, as an exception to B.T.N. heading 29.08.

Hercules Powder Company (Canada) Ltd., speaking as an importer from its parent company of certain products of the pine chemical industry sold to Polymer for use as emulsifiers in the manufacture of synthetic rubber, also recommended that the duty-free status of such materials be maintained.(3)

Nopco Chemical Canada Ltd. opposed the continuation of tariff item 851.(4) It suggested that, as an alternative, any materials of vital interest to the manufacturers of synthetic rubber should be listed specifically and given special treatment until such time as they are made in Canada. The company stated that in its opinion it was not "in general a good principle to allow duty-free entry of a chemical for one industry, and deny the same privilege to others."(5) The company also drew attention to the drawback provisions for imported materials used in making goods for export.

A spokesman for the Industry Committee opposed the continuation of item 851 on the grounds that such items made it impossible for the chemical industry to know what materials are required in Canada and to plan accordingly.(6) He suggested that Polymer should be treated in the same way as anybody else, by the provision of specific named exceptions to B.T.N. headings either with or without an "until made in Canada" limitation. He also pointed to the safeguards provided by the export drawback provisions.

(1) Transcript, Vol. 89, p. 13581

(2) Same, Vol. 90, p. 13701

(3) Same, Vol. 90, p. 13710

(4) Same, Vol. 90, p. 13716

(5) Same, Vol. 90, p. 13718

(6) Same, Vol. 89, p. 13602

Tariff Items 833, 921, 922 and 923

These four items provide for raw materials used in the plastics industry. Under them, the goods are free of duty under both the B.P. and M.F.N. Tariffs. The items are worded:

- 833 Methyl ethyl ketone imported by Canadian manufacturers under such regulations as the Minister may prescribe, for use exclusively as a solvent for polyvinyl chloride.
- 921 Materials of a kind not produced in Canada for use only in the manufacture of goods enumerated in tariff items 901, 902, 903, 904, 905, 906, 907, 909, 910, 911, 912, 913, 914, 916, 917, 918(a), 918(b), 919 and 925, but not including goods themselves enumerated in tariff items 901 to 920 inclusive.
- 922 Phenol for use only in the manufacture of synthetic resin glues.
- 923 Phthalic anhydride, adipic, abietic, maleic and succinic acids, hexamethylene diammonium adipate, hexamethylene diammonium sebacate, hexamethylene diamine, caprolactam, and ethylene glycol, when imported by manufacturers of synthetic resins, for use exclusively in the manufacture of synthetic resins, in their own factories.

Tariff item 921 is a basket end-use item, qualified only by the restriction that the imported materials, for the relevant end-uses, must be "of a kind not produced in Canada." The other three items relate to named products imported for the stated end uses, without reference to their "made-in-Canada" status. Most representations relating to products admissible under these items were made at the hearings on the appropriate headings of the Brussels Tariff Nomenclature, the principal ones of which are listed below. The items themselves were, however, scheduled for consideration with resins and plastics of B.T.N. Chapter 39. At that time, certain additional views were presented and some parties took advantage of the opportunity to repeat proposals made at earlier hearings.

<u>Tariff Item</u>	<u>Product</u>	<u>B.T.N. Heading</u>
833	* Methyl ethyl ketone	29.13
922	* Phenol	29.06
923	* Phthalic anhydride	29.15
923	* Adipic acid	29.15
923	Abietic acid	38.08
923	Maleic acid	29.15
923	Succinic acid	29.15
923	* Hexamethylene diammonium adipate	29.22

<u>Tariff Item</u>	<u>Product</u>	<u>B.T.N. Heading</u>
923	Hexamethylene diammonium sebacate	29.22
923	* Hexamethylene diamine	29.22
923	Caprolactam	29.35
923	** Ethylene glycol	29.04

* Ruled, by the Customs and Excise Division of the Department of National Revenue, to be "of a kind made in Canada."

** Ruled to be "of a class or kind made in Canada." (Department Memoranda D-32 and D-33)

The importance of 921, compared to the other three items, is illustrated by figures available to the Board which suggest that in recent years there have been few, if any, imports under item 833, that imports under item 922 amount to about \$100,000 annually, and under 923 to less than \$2 million. By contrast, imports under 921 appear to have amounted to \$35 to \$40 million per annum. Imports under 923, however, are believed to be increasing as a result of the establishment in Canada of facilities for the manufacture of nylon 6 (polycaprolactam).

General Submissions on End-Use

End-use and end-use items are discussed in Part II of Volume 4 of the Report. A number of submissions, however, related specifically to the items here under consideration.

In introducing the discussion on items 921, 922 and 923, the Industry Committee confined itself to providing the Board with a list of the previous submissions relating to products under these items or in which no change was recommended in the items. In the latter category was the brief of Carlew Chemicals Ltd.⁽¹⁾ which is discussed in the section of the Report on Chapter 39 and the proposal on behalf of the Japan Plastics Industry Association.⁽²⁾

The only mention of item 833 occurred in the general submission on resins and plastics by the Rubber Association of Canada. The Association advocated the continuation of items 833 and 921, or items having a similar effect.⁽³⁾ Under B.N. heading 38.19, the Association had previously opposed any increases on products now admissible under 921.⁽⁴⁾ The Association opposed any increase in cost of its materials, particularly of those not made in Canada. It indicated that its members annually imported some \$2 to \$2.5 million worth of goods under 921;⁽⁵⁾ its members were said to require, annually, 150,000 pounds of methyl ethyl ketone (tariff item 833), valued at \$18,700⁽⁶⁾, but the quantity imported was not indicated. This

(1) Transcript, Vol. 122, p. 18295

(2) Same, Vol. 123, p. 18466

(3) Same, Vol. 123, p. 18395

(4) Same, Vol. 116, p. 17477

(5) Same, Vol. 123, p. 18412

(6) Same, Vol. 123, p. 18411

submission, particularly in relation to item 921, was opposed by Shawinigan Chemicals Ltd., Canadian Industries Limited, Union Carbide Canada Ltd. and Dow Chemical of Canada Ltd., which suggested that goods for which free entry is required until made in Canada, be specifically named and that if they were not named, the Board should reject requests for what was called "special treatment."⁽¹⁾

By letter to the Board, Pacific Resins Ltd., New Westminster, B.C., a producer of phenolic resins for the plywood industry, urged that no duties be applied to such resins or the raw materials from which they are produced, naming items 921, 922 and 925 as relevant.⁽²⁾ This request was opposed by a spokesman for Shawinigan Chemicals, who drew to the Board's attention, in particular, the company's earlier submission on phenol in relation to tariff item 922, made at the hearing on B.T.N. heading 29.06.

Tariff Item 923

The only representations relating to this item were designed to draw the Board's attention to submissions made earlier. Domtar Chemicals Limited repeated its proposal that all phthalic anhydride be dutiable at 15 p.c., B.P., 20 p.c., M.F.N.⁽³⁾ Statements on behalf of Dow Chemical and Union Carbide Canada Ltd. reaffirmed their requests that ethylene glycol, regardless of use, be dutiable at 15 p.c., B.P., 20 p.c., M.F.N.; Dow Chemical also proposed the deletion of item 923, with the relocation of the products under the appropriate B.T.N. headings.⁽⁴⁾

Tariff Item 921

For the specified end-use, tariff item 921 applies to any materials of a kind not produced in Canada, including goods not otherwise classified in items within the scope of Reference 120. This tariff item was mentioned frequently throughout the course of the hearings on Reference 120 in relation to specific goods coming under the B.T.N. headings; these representations have been discussed in the sections of the report on the appropriate B.T.N. headings. No specific representations were received relating to any of the "non-chemical" products understood to be imported under the item.

Very little statistical information is available on imports under tariff item 921. At the time of the hearing, Shawinigan Chemicals Limited suggested that in 1961 three chemicals used in the production of synthetic textile fibres accounted for approximately one-half of the imports shown in the most appropriate D.B.S. statistical classes. These were cyclohexane, dimethyl terephthalate and acrylonitrile; as the last-named has since been ruled to be of a kind produced in Canada, it is no longer admissible under tariff item 921.

(1) Transcript, Vol. 123, p. 18432, 18438, 18443, 18449

(2) Same, Vol. 174, p. 28568

(3) Same, Vol. 174, p. 28574

(4) Same, Vol. 174, p. 28575, 28571

Shawinigan Chemicals Limited made a submission urging the deletion of item 921.⁽¹⁾ The company claimed that the item as written and administered permitted the importation not only of materials for use directly in the manufacture of plastics, but also of materials to make such materials. As a result, imports of materials of a kind not produced in Canada were used to make products competitive with products produced in Canada from Canadian materials. Further, it was claimed that the virtual equation of the word "kind" with chemical identity meant that formulations very similar to and competitive with Canadian-made formulations could be imported under the item without regard to competitive factors. Where there was a demonstrable need for free entry of a product not made in Canada nor competitive with any product made in Canada, the company proposed that free entry could be provided by naming the product specifically. The exception could be limited to the period in which there was no Canadian production. The spokesman for the company admitted that there might be some difficulty in establishing proper criteria of competitiveness, but felt that this could be left to the administrative authorities. A spokesman for the Industry Committee pointed out that competitiveness is administered as a criterion for class or kind in other parts of the Customs Tariff.⁽²⁾

The position of Shawinigan Chemicals was supported by Union Carbide Canada Limited. A spokesman for the latter company indicated that he understood that goods competitive with Canadian-made products had been ruled not made in Canada and admissible under this item on the basis of differences in grade or in process of manufacture.⁽³⁾

At the hearing on paints and related products, the Canadian Paint Varnish and Lacquer Association, Inc., in a section of its general brief dealing with the industry's raw materials, urged the retention of item 921.⁽⁴⁾ The Association had no objection to changes in wording, but felt it was necessary to retain the principle of the item to provide free entry for raw materials for synthetic resin vehicles used in paints. The spokesman for the Association stated that in 1961 imports under tariff item 921 accounted for 1.33 per cent of the chemicals used by the paint industry, with a value of \$640,000.⁽⁵⁾ At that time also, opposition to the retention of tariff item 921 was registered by Shawinigan Chemicals Ltd.⁽⁶⁾

At the hearing on item 921, the Association renewed its previous position but indicated that its needs could be met by separate provision at low rates or free entry for named materials not made in Canada nor competitive with Canadian-made goods.⁽⁷⁾ The spokesman for the Association added that it had made requests for such listings throughout the course of the hearing. An additional request was made for free entry, until made in Canada, for p-tert-Butyl benzoic acid, a product of heading 29.14 used in modified alkyd resins for protective coatings and consumed by the paint industry in the amount of \$25,000 in 1962. To some extent competitive with benzoic acid, it was said to have superior qualities which justified its use even though it costs considerably more.

(1) Transcript, Vol. 173, p. 28311

(2) Same, Vol. 173, p. 28337

(3) Same, Vol. 174, p. 28571

(4) Same, Vol. 91, p. 13745

(5) Same, Vol. 93, p. 14037

(6) Same, Vol. 93, p. 14145

(7) Same, Vol. 173, p. 28330

The Canadian Color Makers Association, commenting on tariff item 921, proposed its replacement by a listing of specific "not made in Canada" pigments.⁽¹⁾

In a submission at the hearing on tariff item 921, McArthur Irwin Limited drew attention to its earlier submissions on lead carbonate (B.T.N. heading 28.42), lead sulphate tri-basic (28.38) and litharge (28.27). While the company preferred that item 921 be eliminated and replaced by a specific list of "not-made" products, it advocated that, if the item were retained, the wording should be altered to "of a class not made in Canada", to eliminate free entry of products competitive with Canadian-made goods.⁽²⁾

Certain parties advocated the retention of item 921 in its present form, although most of the submissions related to specific products in which the companies were interested. A group of firms in the Province of Quebec, described as fabricators of polyvinyl chloride, urged that the item be retained to permit free entry of materials not made in Canada.⁽³⁾ The submission of Advance Solvents & Chemicals Division of Carbide Chemicals Works Inc., New Brunswick, N.J., asked that item 921 be retained,⁽⁴⁾ principally because of the company's interest in vinyl stabilizers of heading 38.19, discussed in that section of the report.

Harrisons & Crosfield (Canada) Limited also proposed the retention of item 921 or of a closely similar item having the same effect. The item was said to assist in reducing costs for Canadian producers who must compete with longer production runs in the U.S.A. As the item applied only to "not made" materials, the company suggested it could not hurt Canadian producers.⁽⁵⁾

Two other submissions at the hearing on item 921 served simply to draw to the attention of the Board proposals made at the hearings on the appropriate B.T.N. headings. These were from Cabot Carbon of Canada Ltd., for silicon dioxide (B.T.N. heading 28.13)⁽⁶⁾ and from the Associated Lead Manufacturers, of Great Britain, on antimony oxide (28.28) and lead phosphite, dibasic (28.40).⁽⁷⁾

Other submissions at the hearing on item 921 related to specific products admissible, at that time, under the item. Those dealing with furfuryl alcohol have been considered in the section of the Report on B.T.N. heading 29.35. This product had been mentioned earlier in the general brief by Archer Daniels Midland Company (Canada) Limited who commented that, while certain products not made in Canada had been proposed for free entry, others had not. As an example of the latter, the company mentioned furfuryl alcohol, which should continue to be admitted free to encourage the Canadian production of furan compounds.⁽⁸⁾ A spokesman for the Industry Committee agreed

(1) Transcript, Vol. 174, p. 28549

(2) Same, Vol. 174, p. 28484

(3) Same, Vol. 174, p. 28472

(4) Same, Vol. 173, p. 28415

(5) Same, Vol. 174, p. 28508

(6) Same, Vol. 174, p. 28489

(7) Same, Vol. 174, p. 28487

(8) Same, Vol. 123, p. 18487

with this proposal, but suggested that it only be free until such time as there should be Canadian production.

Nuodex Products of Canada Limited made a submission on stannous octoate and stannous oleate as concentrations or solutions or as stannous soaps. As single chemically defined compounds, stannous octoate and stannous oleate would be classified in heading 29.14 of the B.T.N. Otherwise, the products would be mixtures of heading 38.19; they are used as catalytic curing agents in the production of polyurethane foam. At the time of the hearing, all these goods, not having been ruled made in Canada, were admitted under tariff item 921. Stannous octoate (stannous 2-ethylhexoate; tin octoate) has since been ruled made and is now dutiable at 15 p.c., B.P., 20 p.c., M.F.N., under either tariff item 711 or 220a(i). Nuodex claimed that it was in a position to supply the Canadian annual requirements of these materials and proposed that they all be dutiable at 15 p.c., B.P., 20 p.c., M.F.N.⁽¹⁾ In commenting on this submission, a spokesman for Advance Solvents & Chemicals raised the question of ensuring that Canadian-made stannous octoate was of sufficient purity to meet the requirements of the Canadian market.⁽²⁾

Three materials, described as polytetramethylene ether glycol, dimethylacetamide and bis (p-isocyanatophenyl) methane, are admitted free of duty under tariff item 921 when used in the manufacture of polyurethane resin for making spandex fibre. Du Pont of Canada Limited proposed continued free entry under both the B.P. and M.F.N. Tariffs.⁽³⁾ The materials, none of which was made in Canada, were said to be essential for making Du Pont's "Lycra", the only Canadian made spandex fibre. This was said to be the only known application although dimethylacetamide, as a solvent, could have other uses. Dimethylacetamide, a product of B.T.N. heading 29.25, was not otherwise drawn to the attention of the Board. Bis (p-isocyanatophenyl) methane is mentioned, under the name of diphenylmethane diisocyanate, in the section of the report on B.T.N. heading 29.30. Polytetramethylene ether glycol apparently would be classified under heading 29.08 if it were either tri-, tetra- or penta- tetramethylene ether glycol; a mixture of these would be classified under heading 38.19.⁽⁴⁾

General Representations

At appropriate times during the course of the public hearings, a number of trade associations and certain companies made submissions not in terms of particular products, B.T.N. headings or tariff items, but in relation to the entire Reference or those parts of it which were of interest to them. Most of these submissions have been discussed, either in the preceding parts of this section of the Report or in other sections with reference to particular products or groups of products; in order to ensure adequate coverage, some of the more important proposals and representations are summarized in the paragraphs which follow.

(1) Transcript, Vol. 174, p. 28493

(2) Same, Vol. 174, p. 28500

(3) Same, Vol. 174, p. 28556

(4) Same, Vol. 174, p. 28561

The Canadian Pulp and Paper Association, on behalf of its members, made specific submissions on the major chemicals of interest to the industry. In addition, it submitted a general brief, listing all the products in Reference 120 used by its members. The Association had no objection to revision in the nomenclature of an "out-moded" Tariff on chemicals, but objected to any increases in rates in respect of chemicals used by the industry because they would lead to increased costs, which, at least in the case of production for the domestic market, could not be offset by drawback provisions. (1)

The Canadian Pharmaceutical Manufacturers Association, speaking on behalf of an industry using annually some \$21 million worth of chemicals, suggested that the needs of its members could best be met by end-use provisions. It proposed rates of Free, B.P., 15 p.c., M.F.N., for those chemicals not made in Canada, and 15 p.c, B.P., 20 p.c., M.F.N., for those made in Canada, when for use in the manufacture of pharmaceutical products. (2) These are the existing rates under items 208t and 711. The Association submitted lengthy lists of chemicals used by its members; even the list that was one restricted to products used to at least the extent of \$1,000 annually by any one of the reporting firms, contained some 500 products. Because of the difficulty of listing all the products individually, the industry felt that some grouping by end-use was essential.

The Toilet Goods Manufacturers Association expressed its concern with the impact of the Reference on materials imported under tariff item 264a as synthetic essential oils. This item, which was not included in Reference 120, has been applied to any odoriferous chemical which is volatile and oily in character and used for flavouring or perfuming purposes unless the product is named elsewhere in the Tariff. (3) By contrast, in the B.T.N., single defined chemicals are excluded from the provision for essential oils and fall under the appropriate headings of Chapter 29. The Association, speaking for 155 companies concerned in the importation, sale or use of essential oils and aromatic chemicals, felt that items based on Chapter 29 would take precedence over item 264a, with its "n.o.p." provision; as a result, raw materials for the industry could be subject to rates higher than those on the flavouring or perfuming products made from them. In order to prevent this, the Association suggested either that the "n.o.p." be removed from 264a, or that the whole item be considered under the Reference. (4) The Association, on another occasion, indicated its interest in retaining the existing rates on materials now imported by its members under tariff item 208t, (5) because such goods are not made in Canada and increases in duties would lead to increased costs.

The Rubber Association of Canada had 10 members in 1962, which constituted 90 per cent of the industry making rubber and related products. On a number of occasions it registered its opposition to any changes which would increase the duties applicable to goods used by the industry, on the grounds that such increases, by increasing its costs,

(1) Transcript, Vol. 36, p. 5246-7

(2) Same, Vol. 87, p. 13278

(3) Same, Vol. 57, p. 8694

(4) Same, Vol. 87, p. 13216

(5) Same, Vol. 168, p. 27725

would reduce the competitiveness of the industry. In a brief directed particularly to tariff item 208t, the Association stated that, in 1962, its members imported under this item goods to the value of \$191,800, under the B.P. Tariff, and \$1,514,900 under the M.F.N. Tariff. Imports were said to be of goods not made in Canada and for which no Canadian-made substitutes were available. The Association suggested that the 15 p.c., M.F.N. rate was of no value to the Canadian chemical industry as a deterrent to imports because products ceased to be classified under the item when made in Canada. Therefore it recommended that there be an item to provide free entry under both the B.P. and M.F.N. Tariffs for "chemicals of a class not produced in Canada";⁽¹⁾ such an item would give its members free access to the broader range of rubber chemicals available in the U.S.A. The discussion of the proposal indicated that there are materials now admitted under 208t which would not be considered single defined chemicals under the B.T.N.; many of these would be classified in heading 38.19. The Industry Committee suggested that the classification of some of these goods under tariff item 208t was incorrect and that it would be preferable to list the goods which were to be accorded free entry. The Association agreed that some broad form of listing by categories would be acceptable.⁽²⁾

The Canadian Feed Manufacturers National Association, representing 95 per cent of all Canadian feed manufacturers, requested free entry under both the B.P. and M.F.N. Tariffs, for all chemicals used in the manufacture of livestock and poultry feed.⁽³⁾ Under the existing Tariff, item 219h provides free entry for "chemicals, except antibiotics, of a kind not produced in Canada, without admixture or mixed only with any necessary carrier or diluent, when for use in the manufacture of animal poultry feeds." Similarly, item 219f permits free entry of "Riboflavin (also known as Vitamin B2, Vitamin G, Lactoflavin) without admixture or mixed only with any necessary carrier or diluent when imported for use only in the manufacture of feeds for livestock, poultry or fur-bearing animals." These two items were not included in Reference 120 and are not part of the Board's recommendations. The request amounts to a removal from item 219h of the exclusion of antibiotics and of the "not made" provision. In presenting the proposal, a spokesman for the Association stated that on occasion, when a product is ruled "made" and becomes dutiable, imported material continues to be used because of technical reasons and doubts as to the substitutability of the Canadian product. He further claimed that competition among Canadian feed manufacturers would ensure that any reduction in costs, resulting from the proposed new item, would be passed on to the customers of the industry.

A number of other Associations, on various occasions, requested continuation of present duty-free entry for materials used by their members, or extension of such free entry to further materials; in some cases the request was restricted to goods not produced in Canada. Their views have been discussed at appropriate places in the Report. Such groups included the Canadian Federation of Agriculture, the National Farmers Union, the Council of the Forest Industries of

(1) Transcript, Vol. 165, p. 24369

(2) Same, Vol. 165, p. 24405

(3) Same, Vol. 77, p. 11808

British Columbia, the Canadian Textiles Institute, the Canadian Manufacturers of Chemical Specialties Association and the Tanners Association of Canada. The Association of British Chemical Manufacturers urged the retention of existing margins of preference and pointed to the Australian system of ensuring that goods are unavailable from Britain before removing such margins.⁽¹⁾

Certain companies, in addition to presentations on products of particular interest, took general stands on the References as a whole. The views of Polymer Corporation Limited on tariff item 851 have been discussed earlier in this section of the Report. Naugatuck Chemicals Division of the Dominion Rubber Company Limited indicated that it would not oppose the application of rates requested on its raw materials if the Board recommended the rates the company proposed for its finished products. Cominco Limited opposed any increases in duties which could lead to reciprocal increases by countries importing from Canada or which would increase the company's costs of production; it also drew attention to the problems of supplying consumers in Western Canada from plants in Central and Eastern Canada.⁽²⁾

(1) Transcript, Vol. 171, p. 28266

(2) Same, Vol. 171, p. 28259

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Table 1

Imports: Synthetic Resins and Plastics Materials
of B.T.N, Chapter 39, 1962-64

	1962		1963		1964	
	'000 lb.	\$'000	'000 lb.	\$'000	'000 lb.	\$'000
<u>39.01</u>						
Phenol-formaldehyde resins	7,462	2,303	6,482	1,850	7,911	2,116
Melamine-formaldehyde resins	6,569	2,467	6,045	2,231	4,658	1,637
Amino-aldehyde resins, n.e.s.	9,943	2,327	12,707	2,692	15,016	2,836
Polyester resins (alkyd and allyl)	6,966	2,550	7,057	2,486	7,991	2,821
Epoxy resins			2,278	1,367	2,214	1,412
Synthetic resin glue	2,871	1,168	3,403	1,385	3,810	1,525
Total, 39.01	33,811	10,815	37,972	12,011	41,600	12,347
<u>39.02</u>						
Polypropylene			6,363	1,878	9,275	2,286
Polyethylene resins	27,146	7,604	22,437	5,332	26,669	6,248
Acrylonitrile-butadiene-styrene resins	3,496	1,577	5,084	2,292	5,544	2,380
Polystyrene resins, n.e.s.	9,792	2,682	9,543	2,497	10,407	2,732
Acrylic resins	12,010	4,242	13,534	5,087	14,594	5,301
Vinyl chloride resins	32,440	6,197	34,171	6,381	42,774	8,446
Vinyl resins, n.e.s.	12,301	3,954	13,984	4,764	12,490	4,637
Sub-total, resins, 39.02	97,185	26,256	105,116	28,231	121,753	32,030
Polyethylene film and sheet	3,105	2,348	3,803	2,175	4,647	2,275
Acrylic film and sheet	4,904	3,589	4,376	3,116	6,160	4,167
Vinyl chloride film and sheet	4,040	2,162	8,225	3,941	6,085	3,124
Vinyl butyral film and sheet	963	1,418	1,024	1,524	1,161	1,709
Vinyl film and sheet, n.e.s.	5,399	3,721	4,278	2,748	5,231	3,336
Sub-total, film and sheet, 39.02	18,411	13,238	21,706	13,504	23,284	14,611
Floor and wall tiles, asphalt(a)	541	59	122	14	71	6
Floor and wall tiles, vinyl-asbestos(a)	4,446	726	4,592	725	3,369	336
Sub-total, tiles, 39.02	4,987	785	4,714	739	3,440	342
Total, 39.02 (excluding tiles)	115,596	39,494	126,822	41,735	145,037	46,641

Table 1
(Cont'd)

	1962		1963		1964	
	'000 lb.	\$'000	'000 lb.	\$'000	'000 lb.	\$'000
<u>29.03</u>						
Cellulose nitrate, except explosive grades	5,693	1,804	5,529	1,790	6,158	1,942
Cellulose acetate	3,438	1,052	3,563	1,109	2,881	888
Cellulose acetate butyrate	1,371	870	1,557	995	1,647	1,040
Cellulose plastics, n.o.p., including cellulose plastics scrap and waste	2,954	1,512	3,136	1,554	3,747	1,857
Sub-total, resins, 39.03	13,456	5,238	13,785	5,448	14,433	5,727
Sheet cellulose acetate, in rolls, for the manufacture of sensitized photographic film	699	930	816	1,151	776	1,181
Cellulose acetate film and sheet, n.e.s.	2,952	2,999	2,751	2,936	2,776	2,751
Regenerated cellulose film and sheet	2,445	1,382	1,259	806	1,602	939
Cellulosic film and sheet, n.e.s.	359	418	265	365	696	907
Sub-total, film and sheet, 39.03	6,455	5,729	5,091	5,258	5,850	5,778
Total, 39.03	19,911	10,967	18,876	10,706	20,283	11,505
<u>29.05</u>						
Synthetic resins derived from natural resins or tall oil	14,370	2,845	11,940	2,809	12,858	2,899
Unallocated resins and plastics materials						
Synthetic resins, n.e.s., including synthetic resin scrap and waste	26,589	9,211	22,793	7,060	32,590	10,036
Plastics materials, not shaped, n.e.s.	23	9	7	4	100	69
Plastic film and sheet, n.e.s.	2,727	4,658	2,807	5,056	4,132	6,660
Layflat tubing, plastic	245	205	163	146	216	161
Pipe, tubes and rigid or semi-rigid tubing, plastic (except laminated)	1,219	1,043	1,162	1,085	1,205	1,139
Blocks, rods, bars, angles, channels and similar shapes, plastic (except expanded or laminated)	231	333	305	369	265	377

Table 1
(Cont'd)

	<u>1962</u>		<u>1963</u>		<u>1964</u>	
	'000 lb.	\$'000	'000 lb.	\$'000	'000 lb.	\$'000
Foamed and expanded plastics, basic shapes and forms	2,804	2,110	1,919	1,259	1,416	1,122
Laminated plastics materials, fabric base	546	453	855	567	785	749
Laminated plastics materials, n.e.s.	2,254	1,602	2,726	1,817	2,851	1,816
Plastic sheet, reinforced (except laminated)	4,789	1,860	1,387	1,166	1,128	883
Total, unallocated resins and plastics materials	41,427	21,484	34,124	18,529	44,688	23,012
Total Known Resins and plastics materials, B.T.N. 39	225,115	86,390	229,734	86,529	264,466	96,746

(a) Quantity reported in square feet

(b) Quantity data do not include floor and wall tiles

Source: D.B.S., Trade of Canada, Imports

Table 2

Imports: Cellulose nitrate, except explosive grades, s.c. 8652^(a)

Tariff Items 761, 901(a)1, 909(b), 909(c)1, 910

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u> <u>p.c. of</u> <u>Dutiable</u> <u>Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
				(000)		
			<u>1. Total</u>			
1962	5,693	1,804	.32	786	39,374	5.0
1963	5,529	1,790	.32	459	23,263	5.1
1964	6,158	1,942	.32	3	670	19.6
			<u>2. United Kingdom</u>			
1962	-	-	-	-	-	-
1963	11	5	.47	-	-	-
1964	66	27	.41	-	-	-
			<u>3. United States</u>			
1962	5,683	1,801	.32	783	39,237	5.0
1963	5,275	1,718	.33	459	23,263	5.1
1964	5,549	1,782	.32	3	670	19.6

(a) Prior to 1962 included in s.c. 8500, 8530, 8570; beginning in 1964 renumbered as s.c. 423-52

Table 3

Imports: Cellulose acetate, s.c. 8654^(a)

Tariff Items 909(a)2, 909(c)2 and 910

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1962	3,438	1,052	.31	489	24,911	5.1
1963	3,563	1,109	.31	311	16,241	5.2
1964	2,881	888	.31	9	1,297	14.9
<u>2. United Kingdom</u>						
1962	170	64	.37	41	2,039	5.0
1963	147	56	.38	32	1,579	5.0
1964	74	29	.39	*	17	9.9
<u>3. United States</u>						
1962	3,245	978	.30	438	22,330	5.1
1963	3,345	1,019	.30	267	14,051	5.3
1964	2,807	859	.31	9	1,280	15.0

(a) Prior to 1962 included in s.c. 8500, 8530; beginning in 1964 renumbered as s.c. 423-54

Table 4

Imports: Cellulose acetate butyrate, s.c. 8656^(a)

Tariff Items 909(a)3, 909(c)3 and 910

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1962	1,371	870	.63	427	21,804	5.1
1963	1,557	995	.64	256	12,989	5.1
1964	1,647	1,040	.63	7	976	14.6

2. United States

1962	1,371	870	.63	427	21,804	5.1
1963	1,557	995	.64	256	12,989	5.1
1964	1,647	1,040	.63	7	976	14.6

(a) Prior to 1962 included in s.c. 8500, 8530; beginning in 1964 renumbered as s.c. 423-56

Table 5

Imports: Cellulose plastics, n.o.p., including cellulose plastics
scrap and waste, s.c. 8679(a)

Tariff Items 761, 909(a)4 to 909(a)7, 909(c)4 to 909(c)7, 910, 911
and 914

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1962	2,954	1,512	.51	952	143,227	15.0
1963	3,136	1,554	.50	990	157,531	15.9
1964	3,747	1,857	.50	1,039	175,165	16.9
<u>2. United Kingdom</u>						
1962	4	3	.68	-	-	-
1963	12	8	.64	2	84	5.0
1964	21	15	.71	-	-	-
<u>3. United States</u>						
1962	1,970	1,305	.66	807	110,207	13.7
1963	2,084	1,313	.63	825	125,945	15.3
1964	2,541	1,510	.59	858	140,202	16.3
<u>4. Sweden</u>						
1962	720	119	.17	119	28,443	23.9
1963	820	138	.17	138	27,574	20.0
1964	746	163	.22	160	32,019	20.0

(a) Prior to 1962 included in s.c. 8366, 8500, 8530, 8550, 8570;
beginning in 1964 renumbered as s.c. 423-79

Table 6

Imports: Sheet cellulose acetate, in rolls, for the manufacture of sensitized photographic film, s.c. 8753^(a)

Tariff Item 822

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>
	<u>lb.(b)</u>	<u>\$</u>	<u>\$/lb.</u>
	(000)	(000)	
<u>1. Total</u>			
1953	..	1,064	..
1954	..	1,185	..
1955	..	1,347	..
1956	..	1,089	..
1957	..	1,246	..
1958	..	1,347	..
1959	..	1,490	..
1960	..	1,094	..
1961	..	973	..
1962	699	930	1.33
1963	816	1,151	1.41
1964	776	1,181	1.52
<u>2. United States</u>			
1953	..	1,064	..
1954	..	1,185	..
1955	..	1,347	..
1956	..	1,089	..
1957	..	1,246	..
1958	..	1,347	..
1959	..	1,490	..
1960	..	1,094	..
1961	..	973	..
1962	699	930	1.33
1963	816	1,151	1.41
1964	776	1,181	1.52

(a) Prior to 1962, was s.c. 8046; beginning in 1964 renumbered as s.c. 424-53 worded "Cellulose acetate film and sheet in rolls for sensitized photographic film"

(b) Quantities not available prior to 1962

Imports: Cellulose acetate film and sheet, n.o.p., s.c. 8754 ^(a)

Tariff Items 912, 913(b) and 924c

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1962	2,952	2,999	1.02	1,424	86,497	6.1
1963	2,751	2,936	1.07	797	51,205	6.4
1964	2,776	2,751	.99	118	18,369	15.6
<u>2. United Kingdom</u>						
1962	357	318	.89	216	11,699	5.4
1963	296	253	.86	111	5,993	5.4
1964	446	384	.86	2	263	15.0
<u>3. United States</u>						
1962	2,584	2,673	1.03	1,199	74,387	6.2
1963	2,407	2,648	1.10	685	45,168	6.6
1964	2,287	2,333	1.02	103	16,153	15.7

(a) Prior to 1962 included in s.c. 8600; beginning in 1964 renumbered as s.c. 424-54

Table 8

Imports: Regenerated cellulose film and sheet, s.c. 8772^(a)

Tariff Item 918(a)

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	lb.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/lb.	\$	\$	Dutiable
				(000)		Value
<u>1. Total</u>						
1962	2,445	1,382	.57	1,382	279,845	20.2
1963	1,259	806	.64	806	163,774	20.3
1964	1,602	939	.59	937	183,784	19.6
<u>2. United Kingdom</u>						
1962	127	77	.61	77	13,407	17.4
1963	62	38	.61	38	5,752	15.2
1964	82	51	.62	51	7,283	14.4
<u>3. United States</u>						
1962	690	424	.61	424	86,607	20.4
1963	470	322	.68	322	68,421	21.3
1964	613	390	.64	388	76,900	19.8
<u>4. Netherlands</u>						
1962	1,554	839	.54	839	169,303	20.2
1963	715	437	.61	437	87,449	20.0
1964	689	400	.58	400	80,059	20.0

(a) Prior to 1962 included in s.c. 8720; beginning in 1964 renumbered as s.c. 424-72

Table 9

Imports: Cellulosic film and sheet, n.o.p., s.c. 8779^(a)

Tariff Items 660a, 912, 913(a), 913(b), 915(a), 915(c) and 924c

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1962	359	418	1.17	248	29,284	11.8
1963	265	365	1.38	190	19,237	10.1
1964	696	907	1.30	154	20,294	13.2
<u>2. United Kingdom</u>						
1962	20	20	1.00	6	832	13.9
1963	6	7	1.14	3	326	10.5
1964	23	22	.97	3	373	14.9
<u>3. United States</u>						
1962	292	333	1.14	203	25,103	12.4
1963	252	350	1.39	181	18,437	10.2
1964	663	874	1.32	144	18,980	13.2
<u>4. Germany, Fed. Rep. of</u>						
1962	35	35	.99	10	999	9.8
1963	4	6	1.25	5	378	8.1
1964	9	10	1.11	6	815	12.8

(a) Prior to 1962 included in s.c. 8600, 8670, 8700; beginning in 1964 renumbered as s.c. 424-79

Imports: Cellulose acetate film reinforced with wire mesh,
s.c. 5219^(a)

Tariff Item 446f

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	56	30	6,738	22.5
1954	59	25	5,727	22.5
1955	41	21	4,782	22.5
1956	45	20	4,547	22.5
1957	44	20	4,462	22.5
1958	32	17	3,829	22.5
1959	38	17	3,927	22.5
1960	26	15	3,345	22.5
1961	32	16	3,503	22.5

2. United Kingdom

1953	26	-	-	-
1954	33	-	-	-
1955	20	-	-	-
1956	25	-	-	-
1957	24	-	-	-
1958	15	-	-	-
1959	12	-	-	-
1960	5	-	-	-
1961	6	-	-	-

3. United States

1953	30	30	6,738	22.5
1954	25	25	5,727	22.5
1955	21	21	4,782	22.5
1956	20	20	4,547	22.5
1957	20	20	4,462	22.5
1958	17	17	3,829	22.5
1959	17	17	3,927	22.5
1960	15	15	3,345	22.5
1961	16	16	3,503	22.5

(a) Beginning in 1962 included in s.c. 8855

Imports: Beads, drops or other shapes of glass or cellulose acetate,
for the manufacture of imitation pearls, s.c. 7123^(a)

Tariff Item 326d

<u>Year</u>	<u>Total Imports</u> \$ (000)
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1. Total

1953	70
1954	73
1955	107
1956	47
1957	38
1958	32
1959	15
1960	45
1961	33
1962	11
1963	2

2. United States

1953	70
1954	73
1955	103
1956	44
1957	37
1958	29
1959	15
1960	11
1961	6
1962	9
1963	*

^(a) Beginning in 1964 included in s.c. 473-99, "Glass basic products, n.e.s."

Table 12

Imports: Esters or ethers, or combinations thereof, of cellulose, without admixture, s.c. 8500(a)

Tariff Items 909(a)1 to 909(a)7, 909(b), 909(c)1 to 909(c)7

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	1,222	8	836	10.0
1954	1,359	22	2,204	10.0
1955	1,512	13	1,343	10.0
1956	1,642	7	722	10.0
1957	1,924	5	528	10.0
1958	1,952	9	875	10.0
1959	2,076	9	934	10.1
1960	2,074	4	401	10.0
1961	2,514	7	810	11.3
<u>2. United States</u>				
1953	1,222	8	836	10.0
1954	1,359	22	2,204	10.0
1955	1,512	13	1,343	10.0
1956	1,642	7	722	10.0
1957	1,923	5	528	10.0
1958	1,951	9	875	10.0
1959	2,076	9	934	10.1
1960	2,074	4	401	10.0
1961	2,514	7	810	11.3

(a) Beginning in 1962 included in s.c. 8652, 8654, 8656 and 8679

Table 13

Imports: Esters or ethers, or combinations thereof, of cellulose compounded with other materials, for moulding, casting, extruding or pressing, s.c. 8530(a)

Tariff Item 910

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
		<u>1. Total</u>		
1953	930	-	-	-
1954	472	-	-	-
1955	799	-	-	-
1956	1,006	-	-	-
1957	974	-	-	-
1958	1,012	-	-	-
1959	1,460	-	-	-
1960	1,453	-	-	-
1961	1,360	1	261	22.5

2. United States

1953	918	-	-	-
1954	470	-	-	-
1955	799	-	-	-
1956	1,006	-	-	-
1957	960	-	-	-
1958	1,011	-	-	-
1959	1,450	-	-	-
1960	1,432	-	-	-
1961	1,326	-	-	-

(a) Beginning in 1962 included in s.c. 8652, 8654, 8656 and 8679

Imports: Foamed and expanded cellulose plastics in sheets, blocks, boards, granules or powder, s.c. 8550(a)

Tariff Item 914

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	9	-	-	-
1954	39	-	-	-
1955	54	-	-	-
1956	15	-	-	-
1957	107	-	-	-
1958	69	21	4,157	20.0
1959	29	29	5,898	20.0
1960	33	30	5,933	20.0
1961	312	312	62,488	20.0
<u>2. United States</u>				
1953	9	-	-	-
1954	39	-	-	-
1955	26	-	-	-
1956	9	-	-	-
1957	95	-	-	-
1958	63	16	3,203	20.0
1959	26	26	5,158	20.0
1960	31	28	5,599	20.0
1961	312	312	62,488	20.0

(a) Beginning in 1962 included in s.c. 8679 and 8831

Imports: Compositions of esters or ethers of cellulose with
other materials, n.o.p., s.c. 8570(a)

Tariff Items 761 and 911

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	15	15	1,509	10.0
1954	35	35	3,533	10.0
1955	36	36	3,613	10.0
1956	51	51	5,111	10.0
1957	57	57	5,747	10.0
1957 (b)	65	65	6,482	10.0
1958	53	53	5,381	10.1
1959	45	45	4,565	10.0
1960	72	71	7,291	10.2
1961				
<u>2. United States</u>				
1953	15	15	1,509	10.0
1954	35	35	3,533	10.0
1955	36	36	3,613	10.0
1956	51	51	5,111	10.0
1957	57	57	5,747	10.0
1958	65	65	6,482	10.0
1959	53	53	5,381	10.1
1960	45	45	4,565	10.0
1961	72	71	7,291	10.2

(a) Beginning in 1962 included in s.c. 8652 and 8679

(b) Includes former s.c. 8047

Table 16

Imports: Cellulose plastic plates, sheets, strip, film, blocks,
bars, rods, tubes or other primary shapes, s.c. 8600(a)

Tariff Items 912, 913(a), 913(b) and 924a

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	1,211	208	31,173	15.0
1954	1,148	178	25,087	14.1
1955	1,322	211	29,475	14.0
1956	1,592	245	33,925	13.8
1957	1,643	178	23,733	13.3
1958	1,598	128	17,577	13.7
1959	2,045	217	30,061	13.8
1960	2,746	143	19,561	13.7
1961	2,775	165	22,211	13.5
<u>2. United Kingdom</u>				
1953	42	1	163	15.0
1954	25	1	172	15.0
1955	28	2	362	15.0
1956	16	2	241	15.0
1957	28	4	553	15.0
1958	51	5	812	15.0
1959	56	4	530	15.0
1960	45	2	343	15.0
1961	126	4	603	15.0
<u>3. United States</u>				
1953	1,092	207	31,010	15.0
1954	1,072	177	24,915	14.1
1955	1,245	206	28,654	13.9
1956	1,516	244	33,684	13.8
1957	1,582	175	23,180	13.3
1958	1,528	122	16,738	13.7
1959	1,971	212	29,257	13.8
1960	2,667	139	18,981	13.7
1961	2,610	158	21,118	13.4

(a) Beginning in 1962 included in s.c. 8754, 8779, 8812, 8815, 8824 and 8899

Table 17

Imports: Reinforced or supported cellulose plastic plates, sheets, strip, tubing, blocks, bars, rods, in which is incorporated a layer of paper, fibre-board or textile fabric, or a core of fibres whether matted or otherwise arranged, n.o.p., s.c. 8630^(a)

Tariff Items 917(a) and 917(b)

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	471	471	70,625	15.0
1954	447	447	67,025	15.0
1955	517	517	77,485	15.0
1956	550	550	82,238	14.9
1957	335	335	50,020	14.9
1958	432	431	64,356	14.9
1959	638	638	95,104	14.9
1960	392	390	58,377	15.0
1961	398	398	59,730	15.0
<u>2. United Kingdom</u>				
1953	1	1	64	10.0
1954	2	2	281	13.4
1955	5	5	712	14.4
1956	8	8	775	10.1
1957	6	6	574	10.0
1958	14	14	1,744	12.5
1959	17	17	1,976	11.4
1960	3	3	329	11.7
1961	*	*	74	15.0
<u>3. United States</u>				
1953	470	470	70,479	15.0
1954	445	445	66,722	15.0
1955	506	506	75,884	15.0
1956	543	543	81,426	15.0
1957	325	325	48,823	15.0
1958	413	413	61,886	15.0
1959	613	613	91,947	15.0
1960	376	374	56,182	15.0
1961	353	353	53,074	15.0

(a) Beginning in 1962 included in s.c. 8855 and 8899

Imports: Laminated moulded plastic products having cellulose plastics
as the chief bonding agents, s.c. 8650(a)

Tariff Item 916

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	197	196	29,450	15.0
1954	182	182	27,233	15.0
1955	169	169	25,382	15.0
1956	270	270	40,439	15.0
1957	210	209	31,382	15.0
1958	160	160	24,074	15.0
1959	190	190	28,494	15.0
1960	164	164	24,612	15.0
1961	304	304	45,600	15.0
<u>2. United Kingdom</u>				
1953	12	12	1,804	15.0
1954	2	2	288	15.0
1955	3	3	478	15.0
1956	10	10	1,572	15.0
1957	15	15	2,207	15.0
1958	7	7	1,027	15.0
1959	17	17	2,558	15.0
1960	14	14	2,145	15.0
1961	26	26	3,845	15.0
<u>3. United States</u>				
1953	185	184	27,646	15.0
1954	180	180	26,945	15.0
1955	166	166	24,904	15.0
1956	259	259	38,867	15.0
1957	195	195	29,175	15.0
1958	153	153	22,911	15.0
1959	173	173	25,936	15.0
1960	150	150	22,467	15.0
1961	276	276	41,463	15.0

(a) Beginning in 1962 included in s.c. 8840 and 8849

Table 19

Imports: Manufactures of cellulose plastics, n.o.p., s.c. 8700^(a)

Tariff Items 577, 915(a), 915(b) and 915(c)

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	1,434	1,433	276,806	19.3
1954	1,519	1,519	289,351	19.1
1955	1,427	1,425	271,508	19.0
1956	1,629	1,628	318,284	19.6
1957	1,960	1,959	382,753	19.5
1958	2,128	2,127	419,949	19.7
1959	2,110	2,103	414,925	19.7
1960	1,912	1,908	375,909	19.7
1961	1,802	1,799	355,012	19.7
<u>2. United Kingdom</u>				
1953	167	167	24,709	14.8
1954	186	186	27,186	14.6
1955	218	217	32,464	15.0
1956	113	112	16,914	15.1
1957	147	146	21,853	15.0
1958	85	85	12,547	14.8
1959	74	73	10,876	14.8
1960	81	79	11,582	14.6
1961	61	60	8,909	14.8
<u>3. United States</u>				
1953	1,253	1,252	249,124	19.9
1954	1,304	1,304	256,607	19.7
1955	1,184	1,184	234,263	19.8
1956	1,483	1,483	294,877	19.9
1957	1,771	1,771	352,415	19.9
1958	1,977	1,977	394,487	20.0
1959	1,926	1,920	382,162	19.9
1960	1,743	1,740	346,936	19.9
1961	1,636	1,633	324,980	19.9

(a) Beginning in 1962 included in s.c. 8450, 8779, 8815 and 8899

Imports: Manufactures of regenerated cellulose, n.o.p., s.c. 8720^(a)

Tariff Items 918(a), 918(b) and 918(c)

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	1,415	1,415	260,088	18.4
1954	1,213	1,213	231,034	19.0
1955	1,766	1,765	340,152	19.3
1956	1,695	1,695	318,930	18.8
1957	1,873	1,873	350,717	18.7
1958	1,726	1,726	332,578	19.3
1959	1,782	1,778	348,180	19.6
1960	2,356	2,333	463,054	19.8
1961	2,503	2,493	495,648	19.9
<u>2. United Kingdom</u>				
1953	458	458	68,695	15.0
1954	232	232	34,839	15.0
1955	259	259	38,827	15.0
1956	402	402	60,291	15.0
1957	479	479	71,831	15.0
1958	254	254	38,048	15.0
1959	155	155	23,344	15.0
1960	189	189	32,803	17.3
1961	186	186	29,141	15.6
<u>3. United States</u>				
1953	945	945	189,096	20.0
1954	961	961	192,224	20.0
1955	1,470	1,470	294,014	20.0
1956	1,243	1,243	248,679	20.0
1957	1,337	1,337	267,499	20.0
1958	1,356	1,356	271,228	20.0
1959	1,555	1,551	310,603	20.0
1960	2,077	2,055	412,348	20.1
1961	1,603	1,593	323,840	20.3

^(a) Beginning in 1962 included in s.c. 8450, 8772, 8849 and 8899

Table 21

Imports: Synthetic resin or cellulose plastic sheets or plates for
the production of printers' engravings, s.c. 8670(a)

Tariff Item 660a

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable</u> <u>Value</u> \$ (000)	<u>Duty</u> <u>Collected</u> \$	<u>Duty as</u> <u>p.c. of</u> <u>Dutiable</u> <u>Value</u>
<u>1. Total</u>				
1953	76	76	5,723	7.5
1954 (b)	108	108	8,099	7.5
1955	129	129	9,696	7.5
1956	139	138	10,317	7.5
1957	114	112	8,416	7.5
1958	157	156	11,728	7.5
1959	149	138	10,370	7.5
1960	125	124	9,301	7.5
1961	166	163	12,233	7.5
<u>2. United Kingdom</u>				
1953-56	-	-	-	-
1957	2	-	-	-
1958	*	-	-	-
1959	11	-	-	-
1960	1	-	-	-
1961	3	-	-	-
<u>3. United States</u>				
1953	76	76	5,723	7.5
1954	108	108	8,099	7.5
1955	114	114	8,559	7.5
1956	129	128	9,624	7.5
1957	98	98	7,353	7.5
1958	116	116	8,667	7.5
1959	46	46	3,457	7.5
1960	37	37	2,780	7.5
1961	54	54	4,058	7.5

Table 21
(Cont'd)

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>4. Netherlands</u>				
1953-57	-	-	-	-
1958	19	19	1,455	7.5
1959	89	89	6,663	7.5
1960	72	72	5,377	7.5
1961	105	105	7,854	7.5
<u>5. Germany, Fed. Rep. of</u>				
1953-54	-	-	-	-
1955	15	15	1,137	7.5
1956	9	9	693	7.5
1957	14	14	1,063	7.5
1958	21	21	1,606	7.5
1959	3	3	251	7.5
1960	15	15	1,108	7.5
1961	4	4	321	7.5

- (a) Beginning in 1962 included in s.c. 8724, 8729, 8779 and 8799
- (b) Prior to 1955 this class read "Cellulose nitrate sheets with turned edges, for the production of printers' engravings"

Table 22

Imports: Synthetic resins or protein plastics in bars, rods, sheets, plates, strip, film, tubing or other primary shapes, n.o.p., whether coated or decorated or not, s.c. 8870^(a)

Tariff Items 905(a), 905(b), 905(c)1, 905(c)2, 905(d)1, 905(d)2, 905(e)1, 905(e)2, 905(f)1, 905(f)2, 906(a) to 906(e) and 919

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	5,771	4,466	747,483	16.7
1954	6,248	4,529	735,684	16.2
1955	7,506	4,932	804,786	16.3
1956	9,546	5,754	892,931	15.5
1957	9,580	5,545	869,325	15.7
1958	9,736	5,794	937,562	16.2
1959	10,634	6,200	986,674	15.9
1960	11,821	6,638	1,054,259	15.9
1961	15,545	8,836	1,332,906	15.1
<u>2. United Kingdom</u>				
1953	332	21	2,909	13.9
1954	370	17	2,481	14.9
1955	431	25	3,600	14.5
1956	635	47	6,961	14.8
1957	640	90	13,328	14.8
1958	729	51	7,648	14.9
1959	1,055	144	21,374	14.8
1960	842	158	23,708	15.0
1961	1,135	204	30,130	14.8
<u>3. United States</u>				
1953	5,423	4,431	742,595	16.8
1954	5,796	4,464	725,161	16.2
1955	6,863	4,790	781,583	16.3
1956	8,665	5,538	859,300	15.5
1957	8,653	5,252	825,068	15.7
1958	8,657	5,540	898,019	16.2
1959	9,018	5,756	918,463	16.0
1960	10,263	6,168	981,271	15.9
1961	13,212	8,063	1,213,325	15.0

(a) Beginning in 1962 included in s.c. 8699, 8716, 8721, 8724, 8729, 8799, 8812, 8815, 8824 and 8899

Table 23

Imports: Synthetic resins derived from natural resins or tall oil,
s.c. 8640(a)

Tariff Items 901(a)7, 901(b)7, 901(c)4 and 902(f)

Year	Total Imports		Unit Value	Dutiable Value	Duty Collected	Duty as p.c. of Dutiable Value
	lb. (000)	\$ (000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1962	14,370	2,845	.20	1,586	108,314	6.8
1963	11,940	2,809	.24	1,211	75,273	6.2
1964	12,858	2,899	.23	700	46,717	6.7
<u>2. United States</u>						
1962	14,370	2,845	.20	1,586	108,314	6.8
1963	11,940	2,809	.24	1,211	75,273	6.2
1964	12,858	2,899	.23	700	46,717	6.7

(a) Prior to 1962 included in s.c. 8750, 8770, 8800; beginning in 1964 renumbered as s.c. 423-40

Imports: Synthetic resins, n.o.p., including synthetic resin scrap and waste, s.c. 8649(a)

Tariff Items 901(a)4, 901(a)9, 901(b)4, 901(b)8, 901(c)5, 901(d)2, 902(f), 904, 904a and 907

Year	Total Imports		Unit Value	Dutiable Value	Duty Collected	Duty as p.c. of Dutiable Value
	lb. (000)	\$ (000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1962	26,589	9,211	.35	5,632	465,746	8.3
1963	22,793	7,060	.31	3,086	306,499	9.9
1964	32,590	10,036	.31	2,835	331,061	11.7
<u>2. United Kingdom</u>						
1962	376	194	.52	72	5,926	8.2
1963	449	238	.53	50	3,784	7.6
1964	1,640	991	.60	8	1,105	14.5
<u>3. United States</u>						
1962	25,902	8,817	.34	5,443	451,708	8.3
1963	21,904	6,480	.30	2,990	299,381	10.0
1964	30,319	8,614	.28	2,808	327,367	11.7

(a) Prior to 1962 included in s.c. 8750, 8770, 8800, 8830, 8850; in 1963 s.c. 8615 and 8630 were extracted from s.c. 8649; beginning in 1964 renumbered as s.c. 423-49

Imports: Plastics materials, not shaped, n.o.p., s.c. 8699^(a)

Tariff Items 208t, 711 and 919

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1962	23	9	.38	8	1,632	20.1
1963	7	4	.52	4	655	18.1
1964	100	69	.69	63	10,075	16.1
<u>2. United States</u>						
1962	23	9	.38	8	1,632	20.1
1963	5	2	.46	2	478	19.7
1964	98	68	.69	63	10,075	16.1
<u>3. United Kingdom</u>						
1962	-	-	-	-	-	-
1963	2	1	.74	1	177	15.0
1964	2	1	.61	-	-	-

(a) Prior to 1962 included in s.c. 8415, 8870; beginning in 1964 renumbered as s.c. 423-99

Imports: Plastic film and sheet, n.o.p., s.c. 8799^(a)

Tariff Items 660a, 905(a), 905(f)1, 905(f)2, 906(a), 906(e) and 919

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1962	2,727	4,658	1.71	3,779	425,204	11.3
1963	2,807	5,056	1.80	3,336	376,694	11.3
1964	4,132	6,660	1.61	3,597	407,344	11.3
<u>2. United Kingdom</u>						
1962	10	10	.99	8	907	12.0
1963	48	101	2.10	87	9,221	10.5
1964	98	192	1.96	164	17,074	10.4
<u>3. United States</u>						
1962	2,673	4,573	1.71	3,753	423,107	11.3
1963	2,747	4,940	1.80	3,237	366,753	11.3
1964	4,012	6,448	1.61	3,427	389,771	11.4

(a) Prior to 1962 included in s.c. 8670, 8870; beginning in 1964 renumbered as s.c. 424-99

Table 27

Imports: Layflat tubing, plastic, s.c. 8812^(a)

Tariff Items 905(c)1, 905(c)2, 905(d)1, 905(d)2, 905(e)1, 905(e)2, 905(f)1, 905(f)2, 906(c), 906(d), 906(e), 912, 913(a) and 913(b)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u> <u>p.c. of</u> <u>Dutiable</u> <u>Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
				(000)		
<u>1. Total</u>						
1962	245	205	.84	201	32,787	16.3
1963	163	146	.89	134	21,051	15.7
1964	216	161	.74	145	22,294	15.4
<u>2. United States</u>						
1962	235	195	.83	190	30,972	16.3
1963	157	139	.89	128	20,011	15.6
1964	207	152	.74	138	21,184	15.4
<u>3. Netherlands</u>						
1962	11	11	1.01	11	1,815	17.2
1963	6	6	.98	6	1,040	16.9
1964	6	6	.95	6	867	14.9

(a) Prior to 1962 included in s.c. 8600, 8870; beginning in 1964 renumbered as s.c. 425-12

Imports: Pipe, tubes and rigid or semi-rigid tubing, plastic
(except laminated), s.c. 8815(a)

Tariff Items 906(a) to 906(e), 908, 913(a), 913(b), 915(a),
915(c) and 919

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	lb.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/lb.	\$	\$	Dutiable
				(000)		Value
<u>1. Total</u>						
1962	1,219	1,043	.86	980	188,139	19.2
1963	1,162	1,085	.93	987	176,837	17.9
1964	1,205	1,139	.94	1,015	165,332	16.3
<u>2. United Kingdom</u>						
1962	23	18	.80	18	2,477	13.7
1963	10	14	1.36	14	2,174	15.7
1964	31	24	.80	24	3,547	14.7
<u>3. United States</u>						
1962	742	902	1.22	841	162,079	19.3
1963	775	952	1.23	859	157,280	18.3
1964	794	1,006	1.27	885	144,013	16.3
<u>4. Japan</u>						
1962	444	112	.25	112	21,997	19.7
1963	346	97	.28	97	14,399	14.9
1964	352	87	.25	87	14,876	17.1

(a) Prior to 1962 included in s.c. 8600, 8700, 8870, 8950;
beginning in 1964 renumbered as s.c. 425-15

Imports: Blocks, rods, bars, angles, channels and similar shapes,
plastic (except expanded or laminated), s.c. 8824^(a)

Tariff Items 906(a) to 906(e), 913(a), 913(b), 919 and 924a

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	lb.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/lb.	\$	\$	Dutiable
				(000)		Value
<u>1. Total</u>						
1962	231	333	1.44	319	51,133	16.0
1963	305	369	1.21	346	51,814	15.0
1964	265	377	1.43	326	47,390	14.5
<u>2. United Kingdom</u>						
1962	2	2	1.16	2	246	12.5
1963	5	3	.66	3	471	15.9
1964	8	8	1.06	8	1,216	14.6
<u>3. United States</u>						
1962	222	321	1.45	308	49,541	16.1
1963	267	348	1.30	326	48,504	14.9
1964	247	363	1.47	311	45,260	14.5
<u>4. Germany, Fed. Rep. of</u>						
1962	5	5	.96	5	638	13.6
1963	33	16	.50	16	2,659	17.1
1964	9	5	.55	5	716	14.7

(a) Prior to 1962 included in s.c. 8600, 8870; beginning in 1964 renumbered as s.c. 425-24

Imports: Foamed and expanded plastics, basic shapes and forms,
s.c. 8831(a)

Tariff Items 907 and 914

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	Duty as p.c. of Dutiable Value
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
	<u>1. Total</u>					
1962	2,804	2,110	.75	2,096	462,339	22.1
1963	1,919	1,259	.66	1,252	267,073	21.3
1964	1,416	1,122	.79	1,115	223,314	20.0
	<u>2. United States</u>					
1962	2,672	1,997	.75	1,984	436,022	22.0
1963	1,839	1,182	.64	1,175	250,835	21.4
1964	1,335	1,064	.80	1,057	211,902	20.0

(a) Prior to 1962 included in s.c. 8550, 8830; beginning in 1964
renumbered as s.c. 425-31

Imports: Laminated plastics materials, fabric base, s.c. 8840^(a)

Tariff Item 916

Year	Total Imports		Unit	Dutiable	Duty	Duty as
	lb.	\$	Value	Value	Collected	p.c. of
	(000)	(000)	\$/lb.	\$	\$	Dutiable
				(000)		Value
<u>1. Total</u>						
1962	546	453	.83	426	73,691	17.3
1963	855	567	.66	563	101,695	18.1
1964	785	749	.95	738	145,473	19.7
<u>2. United Kingdom</u>						
1962	23	16	.72	16	2,938	18.2
1963	23	21	.92	21	3,586	16.8
1964	72	61	.85	55	9,634	17.5
<u>3. United States</u>						
1962	518	432	.83	405	69,846	17.3
1963	766	512	.67	509	92,459	18.2
1964	673	656	.98	651	130,737	20.1

(a) Prior to 1962 included in s.c. 8650, 8930; beginning in 1964 renumbered as s.c. 425-40

Table 32

Imports: Laminated plastics materials, n.o.p., s.c. 8849^(a)

Tariff Items 660b, 916 and 918(c)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
<u>1. Total</u>						
1962	2,254	1,602	.71	1,581	264,297	16.7
1963	2,726	1,817	.67	1,809	280,045	15.5
1964	2,851	1,816	.64	1,780	259,833	14.6
<u>2. United Kingdom</u>						
1962	177	140	.79	140	24,909	17.9
1963	197	141	.71	141	22,743	16.2
1964	160	128	.80	125	18,420	14.7
<u>3. United States</u>						
1962	2,028	1,436	.71	1,415	234,518	16.6
1963	2,458	1,642	.67	1,634	251,492	15.4
1964	2,522	1,602	.64	1,569	228,691	14.6

(a) Prior to 1962 included in s.c. 8650, 8720, 8930; beginning in 1964 renumbered as s.c. 425-49 with tariff item 660b

Table 33

Imports: Plastic sheet, reinforced (except laminated), s.c. 8855^(a)

Tariff Items 446f, 917(a) and 917(b)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u> <u>p.c. of</u> <u>Dutiable</u> <u>Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
<u>1. Total</u>						
1962	4,789	1,860	.39	1,840	318,725	17.3
1963	1,387	1,166	.84	1,158	196,124	16.9
1964	1,128	883	.78	861	133,601	15.5
<u>2. United Kingdom</u>						
1962	39	23	.59	20	3,327	16.4
1963	13	110	.75	9	1,735	18.7
1964	18	15	.83	13	1,554	12.2
<u>3. United States</u>						
1962	4,669	1,786	.38	1,778	307,935	17.3
1963	1,338	1,134	.85	1,134	192,113	17.0
1964	1,017	820	.81	808	124,956	15.5

(a) Prior to 1962 included in s.c. 5219, 8630, 8900; beginning in 1964 renumbered as s.c. 425-55, with a small portion also included in s.c. 494-85

Imports: Synthetic resins without admixture, s.c. 8750^(a)

Tariff Items 901(a)1 to 901(a)9, 901(d)1 and 901(d)2

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	11,540	3,692	206,975	5.6
1954	12,815	3,839	215,726	5.6
1955	14,850	8,015	498,643	6.2
1956	17,731	10,378	667,566	6.4
1957	18,540	9,147	605,070	6.6
1958	19,613	9,066	602,660	6.6
1959	19,947	10,786	695,676	6.4
1960	22,382	13,182	869,190	6.6
1961	23,542	12,085	784,860	6.5
<u>2. United Kingdom</u>				
1953	1,090	107	6,510	6.1
1954	360	193	9,659	5.0
1955	298	275	15,081	5.5
1956	147	104	5,318	5.1
1957	138	88	4,536	5.2
1958	190	69	3,536	5.1
1959	293	183	10,787	5.9
1960	381	237	12,142	5.1
1961	432	265	13,516	5.1
<u>3. United States</u>				
1953	10,251	3,584	200,407	5.6
1954	12,405	3,646	206,019	5.7
1955	14,315	7,628	477,444	6.3
1956	17,432	10,205	658,740	6.5
1957	18,100	8,859	590,501	6.7
1958	18,907	8,571	577,835	6.7
1959	18,229	9,375	623,426	6.6
1960	20,158	11,342	776,494	6.8
1961	21,124	10,555	705,902	6.7

(a) Beginning in 1962 included in s.c. 8602, 8604, 8609, 8613, 8616, 8617, 8619, 8621, 8624, 8629, 8640 and 8649

Imports: Synthetic resins in solutions or solvents, s.c. 8770^(a)

Tariff Items 901(b)1 to 901(b)8, 901(c)1 to 901(c)5 and 925

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	4,405	2,096	222,079	10.6
1954	3,609	2,047	222,546	10.9
1955	3,834	2,337	233,545	10.0
1956	4,313	2,590	254,107	9.8
1957	4,777	2,865	261,601	9.1
1958	5,816	3,707	327,518	8.8
1959	6,259	4,031	361,222	9.0
1960	6,321	4,299	371,974	8.7
1961	6,989	4,472	396,929	8.9
<u>2. United Kingdom</u>				
1953	32	*	61	12.5
1954	*	-	-	-
1955	6	5	656	12.4
1956	3	2	140	7.0
1957	4	1	27	4.9
1958	3	3	344	10.5
1959	4	2	193	8.8
1960	8	3	335	11.3
1961	16	1	64	9.7

Table 35
(Cont'd)

<u>Year</u>	<u>Total Imports</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>\$</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	(000)	\$	\$	<u>Dutiable</u>
		(000)		<u>Value</u>

3. United States

1953	4,366	2,094	221,949	10.6
1954	3,598	2,044	222,407	10.9
1955	3,801	2,320	232,236	10.0
1956	4,267	2,566	252,685	9.8
1957	4,669	2,771	256,600	9.3
1958	5,551	3,459	314,723	9.1
1959	6,082	3,873	352,842	9.1
1960	6,007	4,010	354,958	8.9
1961	6,659	4,180	377,819	9.0

4. Germany, Fed. Rep. of

1953	5	-	-	-
1954	9	3	139	5.0
1955	25	12	626	5.3
1956	40	21	1,241	5.8
1957	91	81	4,067	5.0
1958	230	214	10,964	5.1
1959	120	106	5,707	5.4
1960	146	124	8,650	7.0
1961	307	287	18,805	6.5

(a) Beginning in 1962 included in s.c. 8602, 8604, 8609, 8613, 8616, 8619, 8621, 8624, 8629, 8640 and 8649

Imports: Synthetic resins compounded with other materials for moulding, casting or extruding, including uncured preforms or blanks for compression moulding, s.c. 8300^(a)

Tariff Items 902(a) to 902(f)

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	3,459	651	71,481	11.0
1954	4,066	657	66,840	10.2
1955	4,471	1,953	186,631	9.6
1956	4,583	2,519	251,765	10.0
1957	4,401	2,348	249,965	10.6
1958	5,989	3,022	332,363	11.0
1959	8,248	3,962	429,147	10.8
1960	7,319	4,003	424,154	10.6
1961	7,202	4,014	446,196	11.1
<u>2. United Kingdom</u>				
1953	299	5	502	10.0
1954	117	7	690	10.0
1955	161	2	250	10.0
1956	228	33	3,309	10.0
1957	299	68	6,758	9.9
1958	388	117	11,657	10.0
1959	360	70	7,015	10.0
1960	261	55	5,140	9.4
1961	298	83	8,195	9.9
<u>3. United States</u>				
1953	3,160	646	70,979	11.0
1954	3,949	650	66,150	10.2
1955	4,308	1,949	186,272	9.6
1956	4,348	2,486	248,443	10.0
1957	4,063	2,248	240,055	10.7
1958	5,562	2,874	317,593	11.0
1959	7,691	3,705	403,466	10.9
1960	6,745	3,668	390,978	10.7
1961	6,783	3,837	428,552	11.2

(a) Beginning in 1962 included in s.c. 8602, 8604, 8609, 8613, 8616, 8617, 8619, 8621, 8624, 8629, 8640 and 8649

Imports: Synthetic resin compositions, n.o.p., s.c. 8850^(a)

Tariff Items 904 and 904a

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	514	514	77,101	15.0
1954	1,159	1,159	143,283	12.4
1955	1,741	1,741	207,846	11.9
1956	1,699	1,699	224,366	13.2
1957	2,091	2,091	266,061	12.7
1958	2,212	2,212	281,056	12.7
1959	2,586	2,579	329,611	12.8
1960	2,719	2,692	361,078	13.4
1961	2,967	2,917	364,470	12.5
<u>2. United Kingdom</u>				
1953	4	4	589	15.0
1954	-	-	-	-
1955	3	3	486	15.0
1956	5	5	794	15.0
1957	2	2	247	15.0
1958	1	1	182	15.0
1959	1	1	219	15.0
1960	*	*	73	15.1
1961	9	9	1,355	15.0
<u>3. United States</u>				
1953	510	510	76,512	15.0
1954	1,158	1,158	143,188	12.4
1955	1,738	1,738	207,286	11.9
1956	1,694	1,694	223,541	13.2
1957	2,085	2,085	265,225	12.7
1958	2,208	2,208	280,562	12.7
1959	2,583	2,576	329,153	12.8
1960	2,712	2,684	359,984	13.4
1961	2,943	2,895	361,141	12.5

(a) Beginning in 1962 included in s.c. 8602, 8613, 8621 and 8649

Table 38

Imports: Sausage casings, n.o.p., s.c. 450^(a)

Tariff Items 12b, 548, 563, 711 and 918c

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u> <u>p.c. of</u> <u>Dutiable</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	Value
				(000)		
<u>1. Total</u>						
1963	842	1,324	1.57	1,317	265,859	20.2
1964	971	1,539	1.58	1,537	289,880	18.9
<u>2. United States</u>						
1963	726	1,130	1.56	1,124	225,300	20.0
1964	861	1,365	1.59	1,363	254,039	18.6
<u>3. Germany, Fed. Rep. of</u>						
1963	116	192	1.66	192	40,369	21.0
1964	108	170	1.57	170	35,059	20.6

(a) Prior to 1963 included in s.c. 2344, 3180, 3392, 4252 and 8423; beginning in 1964 renumbered as s.c. 144-50

Imports: Hollow shapes of glass and of plastics, moulded, for the manufacture of electric light fixtures, s.c. 7088^(a)

Tariff Item 326f

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	1,369	1,363	204,488	15.0
1954	1,379	1,376	206,674	15.0
1955	1,526	1,516	227,399	15.0
1956	1,665	1,655	248,295	14.9
1957	1,587	1,561	234,137	15.0
1958	1,820	1,794	269,116	15.0
1959	2,190	2,176	326,437	15.0
1960	2,458	2,436	365,756	15.0
1961	2,538	2,515	377,614	15.0
1962	3,077	3,055	537,300	17.6
1963	2,861	2,839	449,059	15.8

2. United Kingdom

1953	6	-	-	-
1954	3	-	-	-
1955	10	-	-	-
1956	9	-	-	-
1957	26	-	-	-
1958	26	-	-	-
1959	12	*	8	14.8
1960	23	2	265	15.0
1961	21	*	67	15.4
1962	34	13	673	5.0
1963	24	2	167	8.6

3. United States

1953	1,343	1,343	201,450	15.0
1954	1,348	1,348	202,288	15.0
1955	1,450	1,450	217,439	15.0
1956	1,540	1,540	231,009	15.0
1957	1,449	1,449	217,332	15.0
1958	1,614	1,614	242,104	15.0
1959	1,923	1,921	288,201	15.0
1960	2,091	2,090	313,854	15.0
1961	2,131	2,128	319,511	15.0
1962	2,346	2,344	416,367	17.8
1963	2,163	2,163	342,808	15.9

(a) Beginning in 1964 included in s.c. 681-91

Imports: Casings, synthetic, for meats and meat products,
s.c. 8423(a)

Tariff Items 711 and 905a(2)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$ (000)	\$	
<u>1. Total</u>						
1953	305	416	1.36	416	83,143	20.0
1954	384	530	1.38	530	106,004	20.0
1955	316	469	1.49	467	93,498	20.0
1956	302	423	1.40	423	84,522	20.0
1957	329	434	1.32	434	86,714	20.0
1958	314	431	1.37	431	86,270	20.0
1959	312	507	1.62	504	100,485	19.9
1960	365	544	1.49	534	106,002	19.9
1961	431	588	1.36	577	115,672	20.1
1962	319	477	1.49	475	117,784	24.8
<u>2. United States</u>						
1953	304	415	1.37	415	82,923	20.0
1954	383	528	1.38	528	105,671	20.0
1955	315	468	1.49	466	93,185	20.0
1956	296	413	1.40	413	82,641	20.0
1957	323	424	1.31	424	84,865	20.0
1958	311	426	1.37	426	85,290	20.0
1959	300	487	1.63	484	96,643	20.0
1960	350	516	1.48	506	100,035	19.8
1961	425	576	1.35	565	112,844	20.0
1962	307	457	1.49	455	112,832	24.8

(a) Beginning in 1963 included in s.c. 450

Imports: Manufactures of plastics, n.o.p., s.c. 8450^(a)

Tariff Items 711, 908, 915(a), 915(c), 918(b), 918(c), 920 and 924

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1962	30,517	28,339	6,814,914	24.0
1963	29,275	25,630	5,583,161	21.8
<u>2. United Kingdom</u>				
1962	582	581	111,131	19.1
1963	560	553	95,620	17.3
<u>3. United States</u>				
1962	27,183	25,007	6,044,212	24.2
1963	26,282	22,646	4,978,520	22.0

(a) Prior to 1962 included in s.c. 8700, 8720, 8950; beginning in 1964 included in various statistical classes

Imports: Manufactures, n.o.p., of synthetic resins, or of protein
plastics, s.c. 8950(a)

Tariff Items 216(q), 326(q), 654(a), 711, 908, 920, 924 and 924(b)

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1953	8,830	8,798	1,750,154	19.9
1954	9,330	9,316	1,846,994	19.8
1955	11,582	11,569	2,274,611	19.7
1956	14,621	14,454	2,851,891	19.7
1957	16,146	15,921	3,145,674	19.8
1958	20,313	20,165	3,990,114	19.8
1959	23,690	23,170	4,593,286	19.8
1960	27,311	26,164	5,181,845	19.8
1961	28,080	26,617	5,265,791	19.8
<u>2. United Kingdom</u>				
1953	175	174	26,179	15.0
1954	198	197	29,613	15.0
1955	258	250	37,676	15.0
1956	408	407	61,005	15.0
1957	471	470	70,577	15.0
1958	629	629	93,676	14.9
1959	702	701	105,377	15.0
1960	848	845	126,825	15.0
1961	747	746	112,435	15.1
<u>3. United States</u>				
1953	8,570	8,538	1,706,762	20.0
1954	9,007	8,995	1,792,141	19.9
1955	11,160	11,154	2,204,270	19.8
1956	13,923	13,757	2,734,253	19.9
1957	15,215	14,992	2,984,327	19.9
1958	18,680	18,532	3,695,848	19.9
1959	20,902	20,383	4,070,195	20.0
1960	23,806	22,663	4,527,903	20.0
1961	25,473	24,025	4,790,236	19.9

(a) Beginning in 1962 included in s.c. 8450, 8815 and 8899

Imports: Video tape, n.o.p., s.c. 9015^(a)

Tariff Items 658a, 658b and 696(1)

<u>Year</u>	<u>Total Imports</u> \$ (000)	<u>Dutiable Value</u> \$ (000)	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1961	171	169	33,640	20.0
1962	668	663	144,574	21.8
1963	844	794	168,166	21.2
1964	832	792	156,362	19.8
<u>2. United Kingdom</u>				
1961	2	2	339	15.9
1962	12	12	2,066	16.6
1963	4	4	597	15.1
1964	26	25	3,693	15.0
<u>3. United States</u>				
1961	169	166	33,301	20.0
1962	651	646	141,658	21.9
1963	829	778	165,250	21.2
1964	795	756	150,462	19.9

(a) Prior to July 1961 included in s.c. 8950; beginning in 1964 renumbered as s.c. 636-88

Imports: Plastics fabricated materials, n.o.p., s.c. 8899^(a)

Tariff Items 326(q), 654(a), 906(a), 906(b), 906(c), 906(d), 906(e),
908, 913(a), 913(b), 915(a), 915(c), 917(b), 918(c),
919, 920 and 924(b)

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	p.c. of
				(000)		Dutiable
						Value
<u>1. Total</u>						
1962	2,633	2,005	.76	1,864	422,131	22.6
1963	4,867	5,576	1.15	5,356	1,058,771	19.8
<u>2. United Kingdom</u>						
1962	80	82	1.03	82	17,394	21.2
1963	219	312	1.43	312	51,549	16.5
<u>3. United States</u>						
1962	2,478	1,863	.75	1,728	390,583	22.6
1963	4,250	5,043	1.19	4,833	967,581	20.0

(a) Prior to 1962 included in s.c. 8600, 8630, 8700, 8720, 8870, 8900, 8950; beginning in 1964 included in s.c. 425-90 and 494-85

Table 45

Imports: Plastic tape, s.c. 425-90^(a)

Tariff Items 908 and 915c

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u> <u>p.c. of</u> <u>Dutiable</u> <u>Value</u>
	<u>lb.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	
	(000)	(000)	\$/lb.	\$	\$	
				(000)		
	<u>1. Total</u>					
1964	819	1,061	1.30	1,058	203,118	19.2
	<u>2. United Kingdom</u> 2					
1964	17	29	1.70	29	4,245	14.5
	<u>3. United States</u>					
1964	672	925	1.38	922	177,839	19.3
	<u>4. Germany, Fed. Rep. of</u>					
1964	7	11	1.61	11	2,156	20.0
	<u>5. Japan</u>					
1964	123	96	.78	96	18,878	19.6

(a) Prior to 1964 included in s.c. 8899

Table 46

Imports: Plastics fabricated materials n.e.s., s.c. 425-99^(a)

Tariff Items various

<u>Year</u>	<u>Total Imports</u>		<u>Unit Value</u>	<u>Dutiable Value</u>	<u>Duty Collected</u>	<u>Duty as p.c. of Dutiable Value</u>
	<u>lb.</u>	<u>\$</u>	<u>\$/lb.</u>	<u>\$</u>	<u>\$</u>	
	(000)	(000)		(000)		
<u>1. Total</u>						
1964	7,529	8,617	1.14	8,213	1,565,464	19.1
<u>2. United Kingdom</u>						
1964	266	335	1.26	331	44,042	13.3
<u>3. United States</u>						
1964	6,641	7,899	1.19	7,502	1,448,627	19.3
<u>4. Germany, Fed. Rep. of</u>						
1964	150	130	.87	129	23,275	18.1
<u>5. Japan</u>						
1964	152	58	.38	58	11,234	19.4
<u>6. Taiwan</u>						
1964	212	56	.26	56	11,122	20.0

^(a) Prior to 1964 included in s.c. 7310, 7312 and 8899

Table 47

Imports: Plastic flooring and wall covering n.e.s., s.c. 494-85^(a)

Tariff Items 908 and 917b

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u>
	<u>sq. yd.</u>	<u>\$</u>	<u>Value</u>	<u>Value</u>	<u>Collected</u>	<u>p.c. of</u>
	<u>(000)</u>	<u>(000)</u>	<u>\$/sq. yd.</u>	<u>\$</u>	<u>\$</u>	<u>Dutiable</u>
				<u>(000)</u>		<u>Value</u>
	<u>1. Total</u>					
1964	767	1,032	1.35	1,032	201,307	19.5
	<u>2. United Kingdom</u>					
1964	26	26	.98	26	4,478	17.3
	<u>3. United States</u>					
1964	713	979	1.37	979	186,492	19.0
	<u>4. Belgium/Luxembourg</u>					
1964	10	12	1.19	12	7,412	62.7
	<u>5. Portugal</u>					
1964	11	11	.94	11	2,106	20.0
	<u>6. Japan</u>					
1964	6	4	.72	4	819	19.8

^(a) Prior to 1964 included in s.c. 8855 and 8899

Table 48

Imports: Button blanks, s.c. 496-32^(a)

Tariff Items 650a, 651, 651a, 908 and 920

<u>Year</u>	<u>Total Imports</u> \$	<u>Dutiable Value</u> \$	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1964	219,199	219,199	43,908	20.0
<u>2. United Kingdom</u>				
1964	5,127	5,127	769	15.0
<u>3. United States</u>				
1964	212,321	212,321	42,778	20.1
<u>4. France</u>				
1964	1,590	1,590	318	20.0
<u>5. Japan</u>				
1964	161	161	43	26.7

^(a) Prior to 1964 included in s.c. 9066

Table 49

Imports: Globes, shades, reflectors and refractors, glass or plastic,
for lighting fixtures or portable lamps, s.c. 681-91^(a)

Tariff Items 326-2 and 326f

<u>Year</u>	<u>Total Imports</u> \$	<u>Dutiable Value</u> \$	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1964	3,179,137	3,144,325	478,821	15.2
<u>2. United Kingdom</u>				
1964	30,699	9,591	1,378	14.4
<u>3. United States</u>				
1964	2,404,886	2,391,729	362,522	15.2
<u>4. France</u>				
1964	74,415	74,415	10,718	14.4
<u>5. Germany, Fed. Rep. of</u>				
1964	205,785	205,785	31,575	15.3
<u>6. Netherlands</u>				
1964	89,098	89,098	12,710	14.3
<u>7. Czechoslovakia</u>				
1964	202,934	202,387	30,091	14.9

^(a) Prior to 1964 included in s.c. 7085 and 7088

Imports: Tableware, plastic, s.c. 850-68^(a)

Tariff Items 908 and 915c

<u>Year</u>	<u>Total Imports</u> \$	<u>Dutiable Value</u> \$	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1964	1,212,016	1,206,474	240,677	19.9
<u>2. United Kingdom</u>				
1964	3,423	3,423	507	14.8
<u>3. United States</u>				
1964	1,144,008	1,138,466	227,527	20.0
<u>4. Germany, Fed. Rep. of</u>				
1964	18,114	18,114	3,514	19.4
<u>5. Hong Kong</u>				
1964	18,835	18,835	3,719	19.7
<u>6. Japan</u>				
1964	13,769	13,769	2,683	19.5

(a) Prior to 1964 included in s.c. 8450

Table 51

Imports: Plastic bottles, vials and ampoules, s.c. 950-78^(a)

Tariff Items 477, 908, 915c and 920

<u>Year</u>	<u>Total Imports</u> \$	<u>Dutiable Value</u> \$	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1964	473,807	455,887	90,888	19.9
<u>2. United States</u>				
1964	466,301	448,381	89,395	19.9
<u>3. France</u>				
1964	6,196	6,196	1,235	19.9
<u>4. Germany, Fed. Rep. of</u>				
1964	1,140	1,140	224	19.6
<u>5. Italy</u>				
1964	170	170	34	20.0

(a) Prior to 1964 included in s.c. 8450 and 9212

Imports: Shipping and distribution containers, plastic, and parts
n.e.s., s.c. 950-79(a)

Tariff Items 623, 908, 915c, 918c and 920

<u>Year</u>	<u>Total Imports</u> \$	<u>Dutiable Value</u> \$	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1964	3,233,697	3,223,286	638,019	19.8
<u>2. United Kingdom</u>				
1964	85,355	85,250	12,244	14.4
<u>3. United States</u>				
1964	2,968,373	2,958,067	589,769	19.9
<u>4. France</u>				
1964	28,077	28,077	5,620	20.0
<u>5. Germany, Fed. Rep. of</u>				
1964	39,137	39,137	7,898	20.2
<u>6. Italy</u>				
1964	30,452	30,452	6,241	20.5
<u>7. Hong Kong</u>				
1964	19,220	19,220	3,834	20.0
<u>8. Japan</u>				
1964	39,125	39,125	7,871	20.1

(a) Prior to 1964 included in s.c. 8450 and 9067

Imports: Bottle caps, plastic, s.c. 950-88^(a)

Tariff Items 908, 915c and 920

<u>Year</u>	<u>Total Imports</u>		<u>Unit</u>	<u>Dutiable</u>	<u>Duty</u>	<u>Duty as</u> <u>p.c. of</u> <u>Dutiable</u> <u>Value</u>
	<u>No.</u> (000)	<u>\$</u> (000)	<u>Value</u> \$/000	<u>Value</u> \$ (000)	<u>Collected</u> \$	
			<u>1. Total</u>			
1964	101,009	1,120	11.08	1,118	220,599	19.7
			<u>2. United Kingdom</u>			
1964	1,323	16	11.75	16	2,305	14.8
			<u>3. United States</u>			
1964	98,022	1,091	11.13	1,089	215,659	19.8
			<u>4. France</u>			
1964	449	5	10.37	5	918	19.7
			<u>5. Germany, Fed. Rep. of</u>			
1964	1,130	6	5.10	6	1,143	19.8
			<u>6. Italy</u>			
1964	85	3	34.69	3	574	19.5

(a) Prior to 1964 included in s.c. 8450

Table 54

Imports: Plastic end products, n.e.s., s.c. 961-99(a)

Tariff Items 908, 915a, 915c, 918b, 918c and 920

<u>Year</u>	<u>Total Imports</u> \$	<u>Dutiable Value</u> \$	<u>Duty Collected</u> \$	<u>Duty as p.c. of Dutiable Value</u>
<u>1. Total</u>				
1964	4,075,025	2,763,237	546,591	19.8
<u>2. United Kingdom</u>				
1964	52,908	52,908	8,016	15.2
<u>3. United States</u>				
1964	3,799,622	2,488,742	495,101	19.9
<u>4. Germany, Fed. Rep. of</u>				
1964	88,885	88,885	17,434	19.6
<u>5. Hong Kong</u>				
1964	32,295	32,295	6,337	19.6
<u>6. Japan</u>				
1964	43,178	43,178	8,668	20.1

(a) Prior to 1964 included in s.c. 8450

Table 1

Exports: Synthetic Resins and Plastics Materials
of B.T.N. Chapter 39, 1962-64

	<u>1962</u>		<u>1963</u>		<u>1964</u>	
	'000 lb.	\$'000	'000 lb.	\$'000	'000 lb.	\$'000
Polyethylene resins, not shaped	35,534	6,701	38,964	6,327	54,857	9,109
Polystyrene resins, not shaped	21,715	3,571	30,394	4,269	27,385	3,781
Plastics scrap and waste	5,947	411	5,785	354	6,913	438
Plastic film and sheet	10,618	5,587	11,264	6,755	12,640	7,846
Laminated plastics materials	2,633	1,402	2,572	1,222	3,400	1,616
Plastics basic shapes and forms n.e.s.	..	1,515	12,742	2,449	..	3,534
Plastic end products, n.e.s.	<u>..</u>	<u>254</u>	<u>..</u>	<u>390</u>	<u>..</u>	<u>409</u>
Sub-total		19,441		21,766		26,733
Synthetic and reclaimed rubber and plastics materials, not shaped, n.e.s.(a)	<u>..</u>	<u>73,888</u>	<u>..</u>	<u>77,456</u>	<u>..</u>	<u>85,395</u>
Total of above		<u>93,329</u>		<u>99,222</u>		<u>112,128</u>

(a) The majority of these exports would be synthetic and reclaimed rubber

Source: D.B.S., Trade of Canada, Exports

Table 2

Exports: Cellulose products, s.c. 8080^(a)

<u>Year</u>	<u>Value</u> \$
1953	966,258
1954	8,755,858
1955	14,230,431
1956	10,307,899
1957	12,517,192
1958	10,350,575
1959	12,725,034

^(a) Not available after 1959

Table 3

Exports: Plastic film and sheet, s.c. 8472^(a)

<u>Year</u>	<u>Quantity</u> cwt.	<u>Value</u> \$	<u>Unit Value</u> \$/cwt.
1960	..	3,650,035	..
1961	..	3,870,737	..
1962	106,181	5,586,593	52.61
1963	112,644	6,775,315	60.15
1964	126,398	7,845,980	62.07
1965	132,104	7,353,603	55.67

^(a) Not available prior to 1960. Beginning in 1961 renumbered as s.c. 425-09

Table 4

Exports: Plastics basic shapes and forms n.e.s., s.c. 8473^(a)

<u>Year</u>	<u>Value</u> \$
1960	1,489,632
1961	3,577,023
1962	1,514,676
1963	2,448,987
1964	3,533,858
1965	4,539,384

^(a) Not available prior to 1960. Beginning in 1961 renumbered as s.c. 425-99

Table 5

Exports: Plastics scrap and waste, s.c. 424-89^(a)

<u>Year</u>	<u>Quantity</u> cwt.	<u>Value</u> \$	Unit <u>Value</u> \$/cwt.
1962	59,465	410,706	6.91
1963	57,849	353,668	6.11
1964	69,125	437,674	6.33
1965	66,864	442,334	6.62

(a) Not available prior to 1962

Table 6

Exports: Laminated plastics materials, s.c. 425-49^(a)

<u>Year</u>	<u>Quantity</u> cwt.	<u>Value</u> \$	Unit <u>Value</u> \$/cwt.
1962	26,325	1,401,508	53.24
1963	25,723	1,222,321	47.52
1964	34,003	1,616,340	47.54
1965	21,758	1,004,062	46.15

(a) Not available prior to 1962

Table 7

Exports: Synthetic resins, manufactures of, s.c. 8457^(a)

<u>Year</u>	<u>Value</u> \$
1953	736,084
1954	804,754
1955	1,221,603
1956	1,581,456
1957	2,516,811
1958	2,376,932
1959	4,393,635
1960	1,569,505

(a) Included classes 8472 and 8473 prior to 1960

Exports: Plastic end products, n.e.s., s.c. 960-96^(a)

<u>Year</u>	<u>Value</u> \$
1961	295,505
1962	254,473
1963	389,806
1964	408,529
1965	212,911

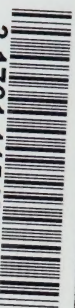
^(a) Not available prior to 1961

APPENDIX IIPrincipal Relevant Recommended Items

	<u>Goods Subject to Duty and Free Goods</u>	<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
R-22	326d - Beads, drops or other shapes of cellulose acetate, glass or synthetic resins, for use exclusively in the manufacture of imitation pearls	Free	Free	Free
R-23	326f - Moulded illuminating shades, reflectors and refractors of glass, of a class or kind not made in Canada, designed for use with light fixtures or with portable lamps	Free	15	32½
R-30	658b - Magnetic recording tape, n.o.p., manufactured from synthetic resins or cellulose plastics:			
	(1) Unrecorded	5	10	25
	(2) Recorded	15	20	25
R-39	Synthetic wax; waxes containing synthetic wax:			
	(1) Other than the following	15	15	25
	(2) Polyethylene of a weight-average molecular weight not exceeding 5000	Free	Free	10
39.03	Regenerated cellulose; cellulose nitrate, cellulose acetate and other cellulose esters, cellulose ethers and other chemical derivatives of cellulose, plasticised or not (for example, collodions, celluloid); not including vulcanised fibre:			
	(a) Without admixture; aqueous emulsions, aqueous dispersions or aqueous solutions, without other admixture; cellulose nitrate with not more than 35 per cent by weight of a dampening agent other than an organic solvent of paragraph (b):			
	1. Other than the following	Free	Free	10
	2. Cellulose nitrate, dynamite grade	5	10	20
	3. Sodium carboxymethyl cellulose	10	15	25

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
39.03 (Cont'd)	(b) In organic solvents where the weight of the solvent, except for collodions, does not exceed 50 per cent of the weight of the solution, without other admixture	7½	7½	20
	(c) Moulding compositions, n.o.p., including scrap or waste, whether or not completely formulated; such compositions in the form of not fully cured preforms for compression moulding	Free	Free	10
	(d) Compositions, n.o.p., composed entirely or predominantly of the cellulosic materials of paragraph (a) above or the collodions of paragraph (b) above	7½	7½	20
	(e) Admixed with other materials to form glues or adhesives packaged or in bulk	15	17½	25
	(f) Foamed and expanded, in logs, sheets, blocks, boards, flakes, granules, powder, shreds, scrap or waste	15	15	25
	(g) Plates, sheets, film, sheeting, strip; lay-flat or other tubing, blocks, bars, rods, sticks, non-textile monofilament and other profile shapes imported in lengths, all produced in uniform cross-section:			
	1. Other than the following	Free	Free	10
	2. Cellulose acetate plates, sheets, film, sheeting and strip, other than unsensitized film for use in the manufacture of sensitized photographic film	10	10	20
	3. Cellulose acetate butyrate plates, sheets, film, sheeting and strip, other than unsensitized film for use in the manufacture of sensitized photographic film	10	10	20
	4. Regenerated cellulose	10	15	25
39.04	Hardened proteins (for example, hardened casein and hardened gelatin)	Free	Free	10

<u>Goods Subject to Duty and Free Goods</u>		<u>B.P.</u>	<u>M.F.N.</u>	<u>G.T.</u>
39.05	Natural resins modified by fusion (run gums); artificial resins obtained by esterification of natural resins or of resinic acids (ester gums); chemical derivatives of natural rubber (for example, chlorinated rubber, rubber hydrochloride, oxidised rubber, cyclised rubber):			
	(1) Other than the following	Free	Free	10
	(2) In organic solvents, where the weight of the solvent does not exceed 50 per cent of the weight of the solution, without other admixture	7½	7½	20
	(3) Compositions, except moulding compounds, composed entirely or predominantly of the resins and the derivatives of natural rubber	7½	7½	20
	(4) Sheets, film, sheeting, strip; lay-flat or other tubing produced in uniform cross-section	10	10	20
39.06	Other high polymers, artificial resins and artificial plastic materials, including alginic acid, its salts and esters; not including other vegetable saps and extracts, pectic substances, pectinates and pectates, agar-agar and other mucilages and thickeners derived from vegetable products, albuminoidal substances, glues, nor linnoxyn:			
	(1) Other than the following	Free	15	25
	(2) Alginic acid salts	Free	Free	15
	(3) Heparin sodium	10	15	25
39.07	Articles of materials of the kinds described in Recommended Items 39.01 to 39.06, n.o.p.	20	20	30



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